

AD A161 YES

CHESAPEAKE BAY LOW FRESHWATER INFLOW STUDY APPENDIX F
MAP FOLIO 10101 CORPS OF ENGINEERS BALTIMORE MD BALTIMORE
DISTRICT SEP 84 CHB-84-L-APP-F

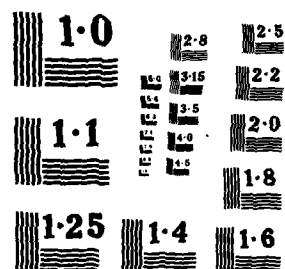
1/3

UNCLASSIFIED

F/G 8/1

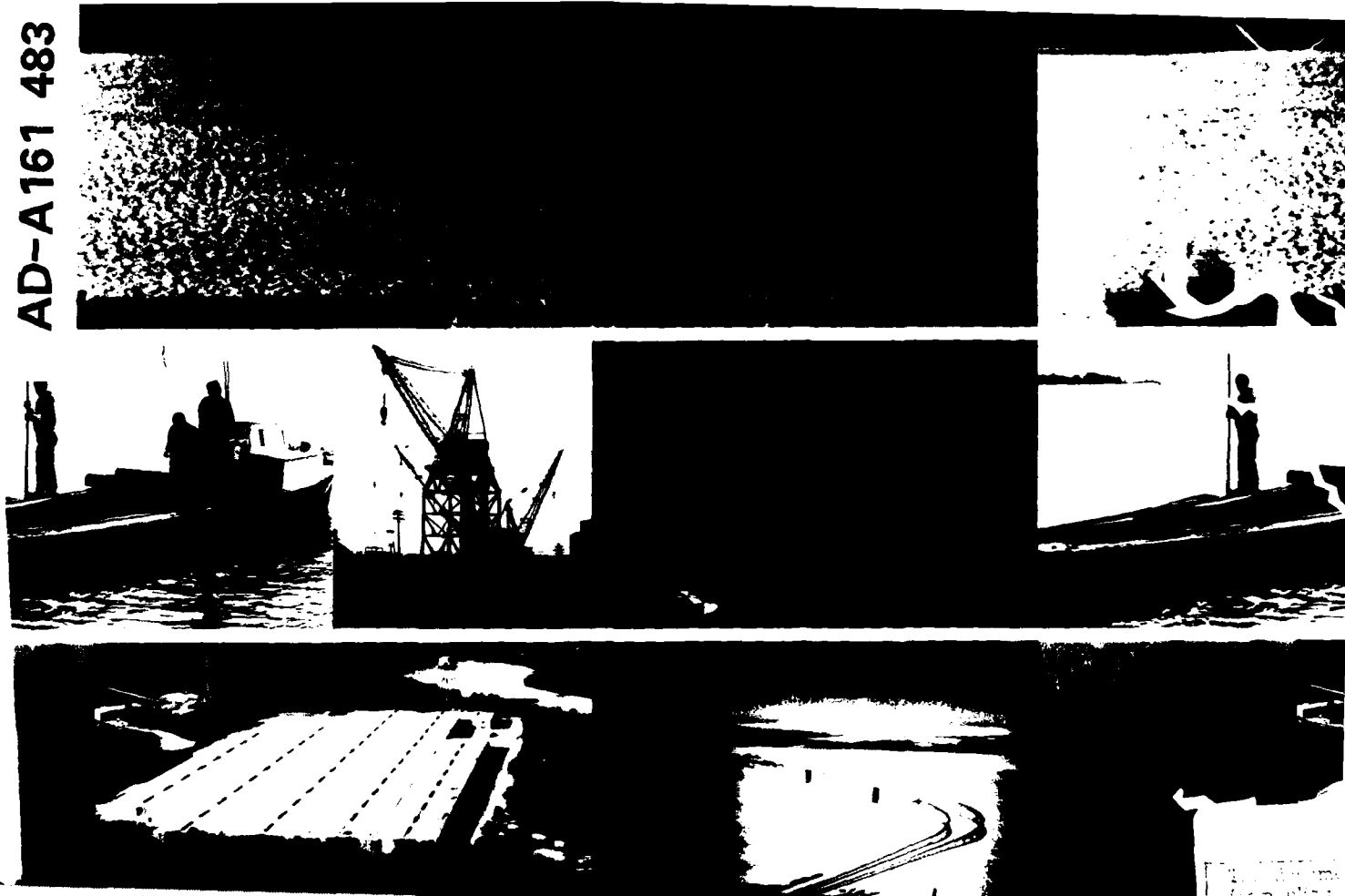
DL





DTIC FILE COPY

AD-A161 483



w Study



This document has been approved
for public release and sale; its
distribution is unlimited.

NOV 25 1985

A

85 11 25 051

September 1984

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER CHB-84-L	2. GOVT ACCESSION NO. <i>AD-A161443</i>	3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) Chesapeake Bay Low Freshwater Inflow Study Main Report, Appendices A through E <i>Appendix F</i>		5. TYPE OF REPORT & PERIOD COVERED	
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Baltimore District US Army Corps of Engineers, ATTN: NABPL P.O. Box 1715, Baltimore, MD 21203-1715		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS Baltimore District US Army Corps of Engineers, ATTN: NABPL P.O. Box 1715, Baltimore, MD 21203-1715		12. REPORT DATE September 1984	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES 1130 pages, 108 plates	
		15. SECURITY CLASS. (of this report) Unclassified	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release, distribution unlimited		15a. DECLASSIFICATION DOWNGRADING SCHEDULE	
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Chesapeake Bay, low freshwater inflow, low flow, hydraulic model, estuary, water supply, water demand, water withdrawal, consumptive loss, biota, habitat, nutrients, salinity, drought, drought management, ecosystem, plankton, tributary, water conservation			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Chesapeake Bay is a complex estuarine system that is dependent on the freshwater inflow from its tributaries to maintain the salinity regime that characterizes its ecosystem. Increasing population and economic growth in the Bay drainage area is predicted to result in increased water supply demands and attendant increases in the amount of water used consumptively. This will cause a marked reduction in freshwater inflow to the Bay and result in higher salinities throughout the Bay			

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

20. ABSTRACT

system. In the long term, salinities would be expected to increase by as much as 2 to 4 ppt.

The Low Freshwater Inflow Study methodology involved selecting representative species for study, mapping potential habitat under various conditions, using expert scientists to interpret the significance of habitat change, and assessing socio-economic and environmental impacts of the changes.

While no specific plan was developed to solve the problems caused by reduced freshwater inflows, several alternatives were identified as "most promising". These include reservoir storage, conservation, growth restriction, oyster bed restoration, and fisheries management.

The final report recommends that a comprehensive water supply and drought management study be conducted that will identify those measures required to optimize the use of existing water supplies in the Bay drainage basin and minimize reductions in freshwater inflow to the Bay.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

Chesapeake Bay Low Freshwater Inflow Study

APPENDIX F - MAP FOLIO

A-1



This document has been approved
for public release and sale; its
distribution is unlimited.



**US Army Corps
of Engineers**
Baltimore District

Study

20

NOV 25 1985

has been approved
use and sale; its
unlimited.

September 1984

Foreword

This is one of the volumes comprising the final report on the Corps of Engineers' Chesapeake Bay Study. The report represents the culmination of many years of study of the Bay and its associated social, economic, and environmental processes and resources. The overall study was done in three distinct developmental phases. A description is provided below of each study phase, followed by a description of the organization of the report.

The initial phase of the overall program involved the inventory and assessment of the existing physical, economic, social, biological, and environmental conditions of the Bay. The results of this effort were published in a seven volume document titled *Chesapeake Bay Existing Conditions Report*, released in 1973. This was the first publication to present a comprehensive survey of the tidal Chesapeake and its resources as a single entity.

The second phase of the program focused on projection of water resource requirements in the Bay Region for the year 2020. Completed in 1977, the *Chesapeake Bay Future Conditions Report* documents the results of that work. The 12-volume report contains projections for resources categories such as navigation, recreation, water supply, water quality, and land use. Also presented are assessments of the capacities of the Bay system to meet the identified future requirements, and an identification of problems and conflicts that may occur with unrestrained growth in the future.

In the third and final study phase, two resource problems of particular concern in Chesapeake Bay were addressed in detail: low freshwater inflow and tidal flooding. In the Low Freshwater Inflow study, results of testing on the Chesapeake Bay Hydraulic Model were used to assess the effects on the Bay of projected future depressed freshwater inflows. Physical and biological changes were quantified and used in assessments of potential social, economic, and environmental impacts. The Tidal Flooding Study included development of preliminary state-damage relationships and identification of Bay communities in which structural and nonstructural measures could be beneficial.

The final report of the Chesapeake Bay Study is composed of three major elements: (1) Summary, (2) Low Freshwater Inflow Study, and (3) Tidal Flooding Study. The *Chesapeake Bay Study Summary Report* includes a description of the results, findings, and recommendations of all the above described phases of the Chesapeake Bay Study.

The *Low Freshwater Inflow Study* consists of a Main Report and six supporting appendices. The report includes:

- Main Report
- Appendix A—Problem Identification
- Appendix B—Plan Formulation
- Appendix C—Hydrology
- Appendix D—Hydraulic Model Test
- Appendix E—Biota
- Appendix F—Map Folio

The *Tidal Flooding Study* consists similarly of a Main Report and six appendices. The report includes:

- Main Report
- Appendix A—Problem Identification
- Appendix B—Plan Formulation, Assessment, and Evaluation
- Appendix C—Recreation and Natural Resources
- Appendix D—Social and Cultural Resources
- Appendix E—Engineering, Design, and Cost Estimates
- Appendix F—Economics

- Summary Report
- Supplement A—Problem Identification
- Supplement B—Public Involvement
- Supplement C—Hydraulic Model

Introduction

This appendix is a principal product of the Biota Assessment portion of the Corps of Engineers' Chesapeake Bay Low Freshwater Inflow Study. The purpose of the mapping is to portray habitat for selected Chesapeake Bay species under a variety of freshwater inflow conditions. They are based on the results of tests done on the Chesapeake Bay Hydraulic Model simulating four freshwater inflow conditions. These were:

- 1) Base Average—average freshwater inflow conditions;
- 2) Future Average—reflective of average inflow conditions reduced by increased water consumption projected for the year 2020;
- 3) Base Drought—simulating an actual drought in the 1960's;
- 4) Future Drought—simulated 1960's drought inflows, reduced by increased water consumption projected for the year 2020.

Data from the hydraulic model tests were subsequently used to generate seasonal average salinities at various depths from the mouth of the Bay to the head of tide in each tributary. These salinity data, in conjunction with data on depth, substrate, and dependence on other organisms, were used to create the maps of habitat portrayed in this volume. For further discussion of the information presented herein, the reader is referenced to Appendix E, Biota and the Chesapeake Bay Low Freshwater Inflow Study Biota Assessment, Phase II; Final Report, May 1982, prepared by Western Eco-Systems Technology for the Corps of Engineers.

TABLE OF CONTENTS

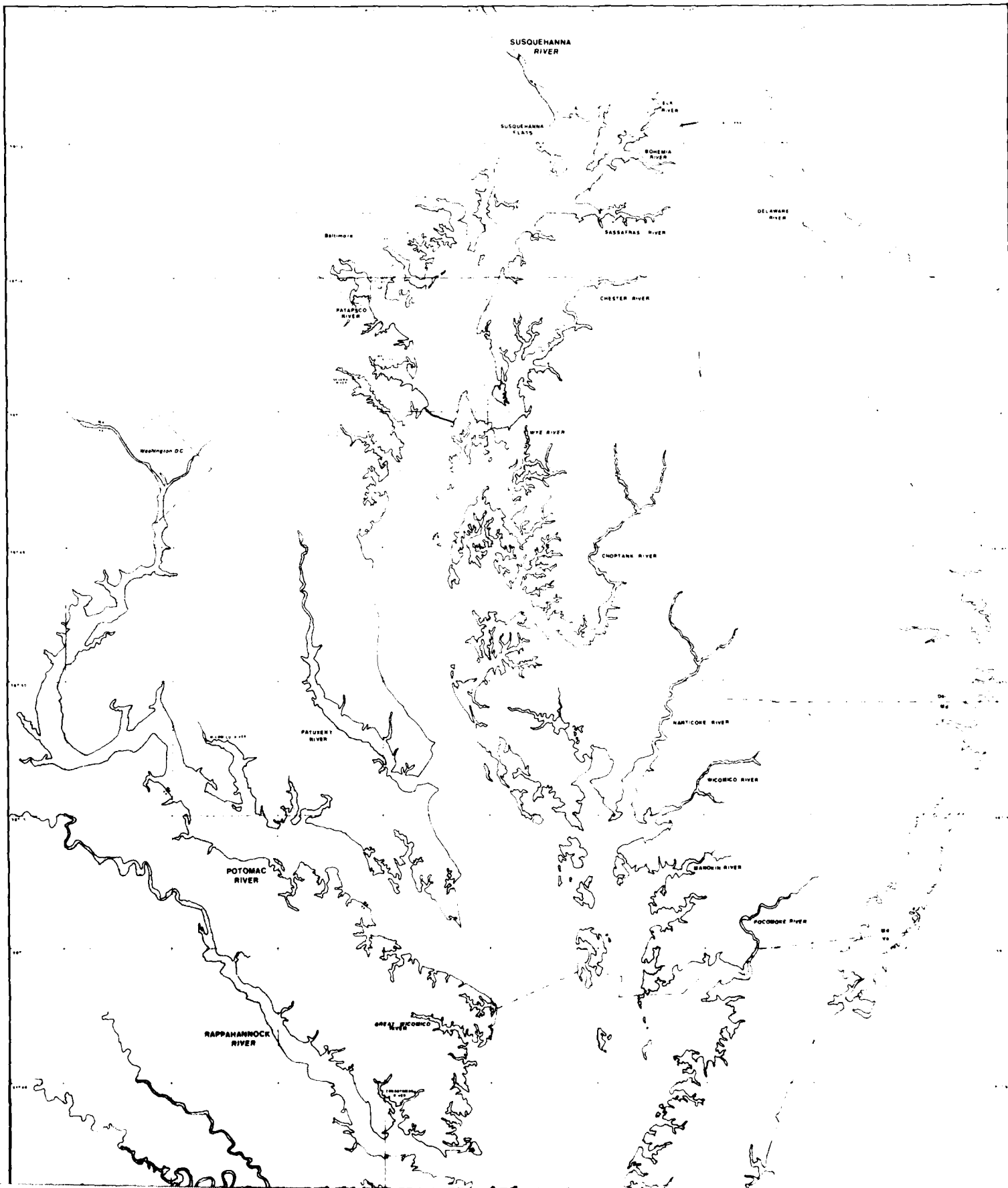
<u>TITLE</u>	<u>Plate No.</u>
Base Average	
Tidal Fresh Phytoplankton, Winter/Spring	1
Oligo-Low Mesohaline Phytoplankton, Winter/Spring	2
Mesohaline Phytoplankton, Winter/Spring	3
Polyhaline Phytoplankton, Summer/Fall	4
Tidal Fresh Phytoplankton, Summer/Fall	5
Oligo-Low Mesohaline Phytoplankton, Summer/Fall	6
Mesohaline Phytoplankton, Summer/Fall	7
<u>Prorocentrum minimum</u> (Dinoflagellate)	8
<u>Ceratophyllum demersum</u> (Coontail)	9
<u>Ruppia maritima</u> (Widgeon Grass)	10
<u>Zostera marina</u> (Eelgrass)	11
<u>Zannichellia palustris</u> (Horned Pondweed)	12
Emergent Aquatic Vegetation (Coastal Fresh Marsh)	13
<u>Mnemiopsis leidyi</u> Summer (Ctenophore - Sea Walnut)	14
<u>Mnemiopsis leidyi</u> Winter (Ctenophore - Sea Walnut)	15
<u>Brachionis calyciflorus</u> (Rotifer)	16
<u>Acartia clausi</u> (Copepod)	17
<u>Acartia tonsa</u> (Copepod)	18
<u>Scottolana canadensis</u> (Copepod)	19
<u>Bosmina longirostris</u> (Cladoceran)	20
<u>Evadne tergestina</u> (Cladoceran)	21
<u>Podon polyphemoides</u> (Cladoceran)	22
<u>Limnodrilus hoffmeisteri</u> (Oligochaete Worm)	23
<u>Heteromastus filiformis</u> (Polychaete Worm)	24
<u>Pectinaria gouldii</u> (Polychaete Worm)	25
<u>Scolecopides viridis</u> (Polychaete Worm)	26
<u>Streblospio benedicti</u> (Polychaete Worm)	27
<u>Mulinia lateralis</u> (Coot Clam)	28
<u>Rangia cuneata</u> (Brackish Water Clam)	29
<u>Ampelisca abdita</u> (Amphipod)	30
<u>Balanus improvisus</u> (Acorn Barnacle)	31
<u>Cyathura polita</u> (Isopod)	32
<u>Gammarus dalberi</u> (Amphipod)	33
<u>Leptocheirus plumulosus</u> (Amphipod)	34
<u>Palaemonetes pugio</u> (Grass Shrimp)	35
<u>Alosa pseudoharengus</u> (Alewife - Eggs & Larvae)	36
<u>Alosa pseudoharengus</u> (Alewife - Juveniles)	37
<u>Micropogonias undulatus</u> (Atlantic Croaker)	38
<u>Menidia menidia</u> (Atlantic Silverside)	39
<u>Morone americana</u> (White Perch)	40
<u>Perca flavescens</u> (Yellow Perch)	41
Base Average (Major 15 Species)	
<u>Potamogeton pectinatus</u> (Sago Pondweed)	42
<u>Potamogeton perfoliatus</u> (Redhead Grass)	42
<u>Chrysaora quinquecirrha</u> (Sea Nettle)	43
<u>Eurytemora affinis</u> (Copepod)	44
<u>Urosalpinx cinerea</u> (Oyster Drill)	45
<u>Crassostrea virginica</u> (American Oyster)	46
<u>Macoma balthica</u> (Baltic Macoma)	47
<u>Mercenaria mercenaria</u> (Hard Clam)	48
<u>Mya arenaria</u> (Soft Clam)	49
<u>Callinectes sapidus</u> (Blue Crab - Summer males)	50
<u>Callinectes sapidus</u> (Blue Crab - Summer females)	51
<u>Alosa sapidissima</u> (American Shad)	52
<u>Brevoortia tyrannus</u> (Menhaden)	53

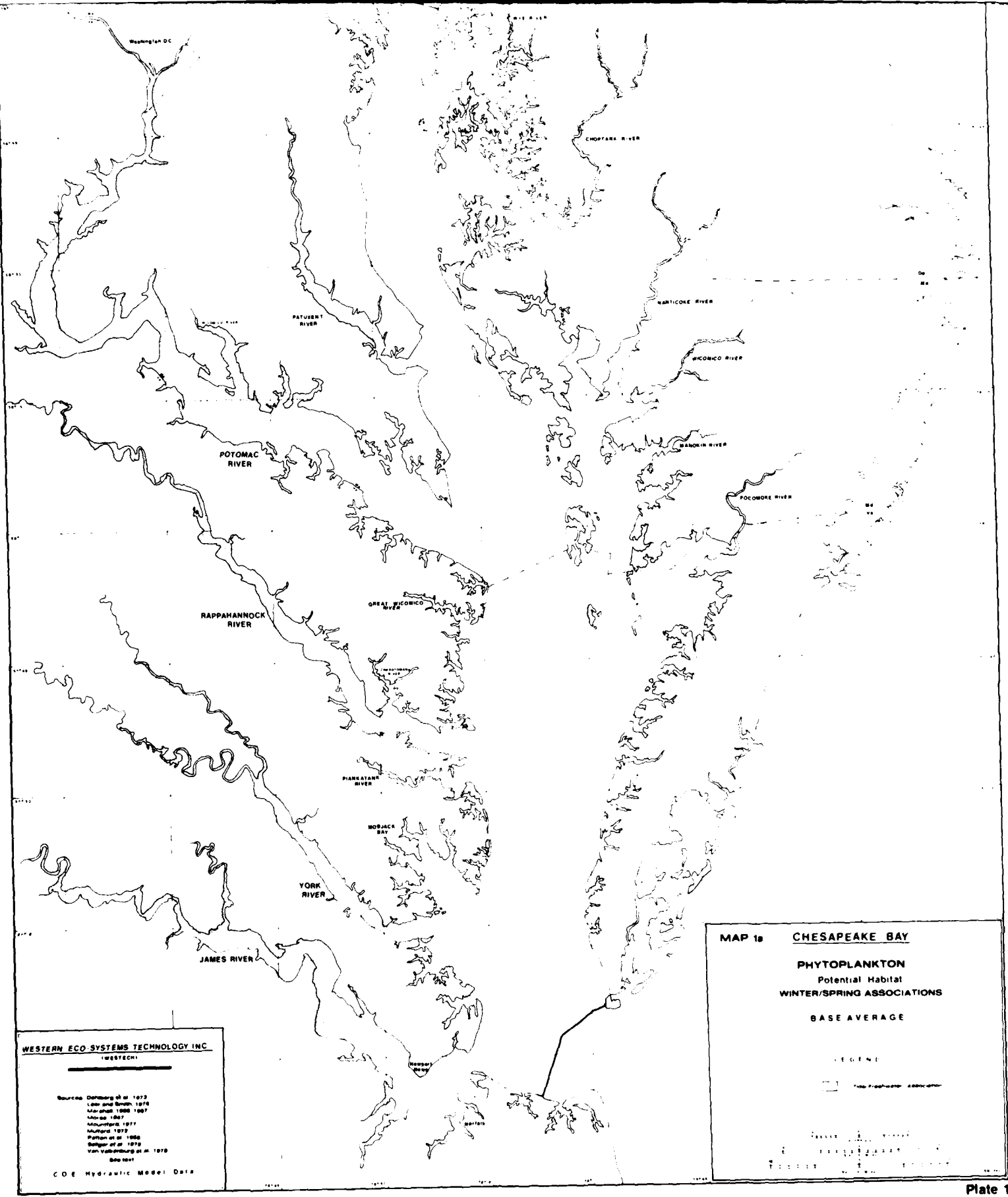
TABLE OF CONTENTS (Cont'd)

<u>TITLE</u>	<u>Plate No.</u>
<u>Anchoa mitchilli</u> (Bay Anchovy)	54
<u>Leiostomus xanthurus</u> (Spot)	55
<u>Morone saxatilis</u> (Striped Bass)	56
<u>Aythya valisineria</u> (Canvasback Duck)	57
Future Average (Major 15 Species)	
<u>Potamogeton pectinatus</u> (Sago Pondweed)	58
<u>Potamogeton perfoliatus</u> (Redhead Grass)	58
<u>Chrysaora quinquecirrha</u> (Sea Nettle)	59
<u>Eurytemora affinis</u> (Copepod)	60
<u>Urosalpinx cinerea</u> (Oyster Drill)	61
<u>Crassostrea virginica</u> (American Oyster)	62
<u>Macoma balthica</u> (Baltic Macoma)	63
<u>Mercenaria mercenaria</u> (HardClam, Quahog)	64
<u>Mya arenaria</u> (Soft-Shell Clam)	65
<u>Callinectes sapidus</u> (Blue Crab - summer males)	66
<u>Callinectes sapidus</u> (Blue Crab - summer females)	67
<u>Alosa sapidissima</u> (American Shad)	68
<u>Brevoortia tyrannus</u> (Menhaden)	69
<u>Anchoa mitchilli</u> (Bay Anchovy)	70
<u>Leiostomus xanthurus</u> (Spot)	71
<u>Morone saxatilis</u> (Striped Bass)	72
<u>Aythya valisineria</u> (Canvasback Duck)	73
Base Drought (Major 15 Species)	
<u>Potamogeton pectinatus</u> (Sago Pondweed)	74
<u>Potamogeton perfoliatus</u> (Redhead Grass)	74
<u>Chrysaora quinquecirrha</u> (Sea Nettle)	75
<u>Eurytemora affinis</u> (Copepod)	76
<u>Urosalpinx cinerea</u> (Oyster Drill)	77
<u>Crassostrea virginica</u> (American Oyster)	78
<u>Macoma balthica</u> (Baltic Macoma)	79
<u>Mercenaria mercenaria</u> (Hard Clam, Quahog)	80
<u>Mya arenaria</u> (Soft-Shell Clam)	81
<u>Callinectes sapidus</u> (Blue Crab - summer males)	82
<u>Callinectes sapidus</u> (Blue Crab - summer females)	83
<u>Alosa sapidissima</u> (American Shad)	84
<u>Brevoortia tyrannus</u> (Menhaden)	85
<u>Anchoa mitchilli</u> (Bay Anchovy)	86
<u>Leiostomus xanthurus</u> (Spot)	87
<u>Morone saxatilis</u> (Striped Bass)	88
<u>Aythya valisineria</u> (Canvasback Duck)	89
Future Drought (Major 15 Species)	
<u>Potamogeton pectinatus</u> (Sago Pondweed)	90
<u>Potamogeton perfoliatus</u> (Redhead Grass)	90
<u>Chrysaora quinquecirrha</u> (Sea Nettle)	91
<u>Eurytemora affinis</u> (Copepod)	92
<u>Urosalpinx cinerea</u> (Oyster Drill)	93
<u>Crassostrea virginica</u> (American Oyster)	94
<u>Macoma balthica</u> (Baltic Macoma)	95
<u>Mercenaria mercenaria</u> (HardClam, Quahog)	96
<u>Mya arenaria</u> (Soft-Shell Clam)	97
<u>Callinectes sapidus</u> (Blue Crab - summer males)	98
<u>Callinectes sapidus</u> (Blue Crab - summer females)	99
<u>Alosa sapidissima</u> (American Shad)	100

TABLE OF CONTENTS (Cont'd)

<u>TITLE</u>	<u>Plate No.</u>
<u>Brevoortia tyrannus</u> (Menhaden)	101
<u>Anchoa mitchilli</u> (Bay Anchovy)	102
<u>Leiostomus xanthurus</u> (Spot)	103
<u>Morone saxatilis</u> (Striped Bass)	104
<u>Aythya valisineria</u> (Canvasback Duck)	105





WESTERN ECO SYSTEMS TECHNOLOGY INC
WESTECH

Sources: Dahmberg et al. 1973
Laur and Smith 1976
Meador 1980 1987
Meador 1987
Munroffers 1977
Munroffers 1977
Patterson et al. 1986
Simpson et al. 1976
Van Vleet et al. 1979
See text

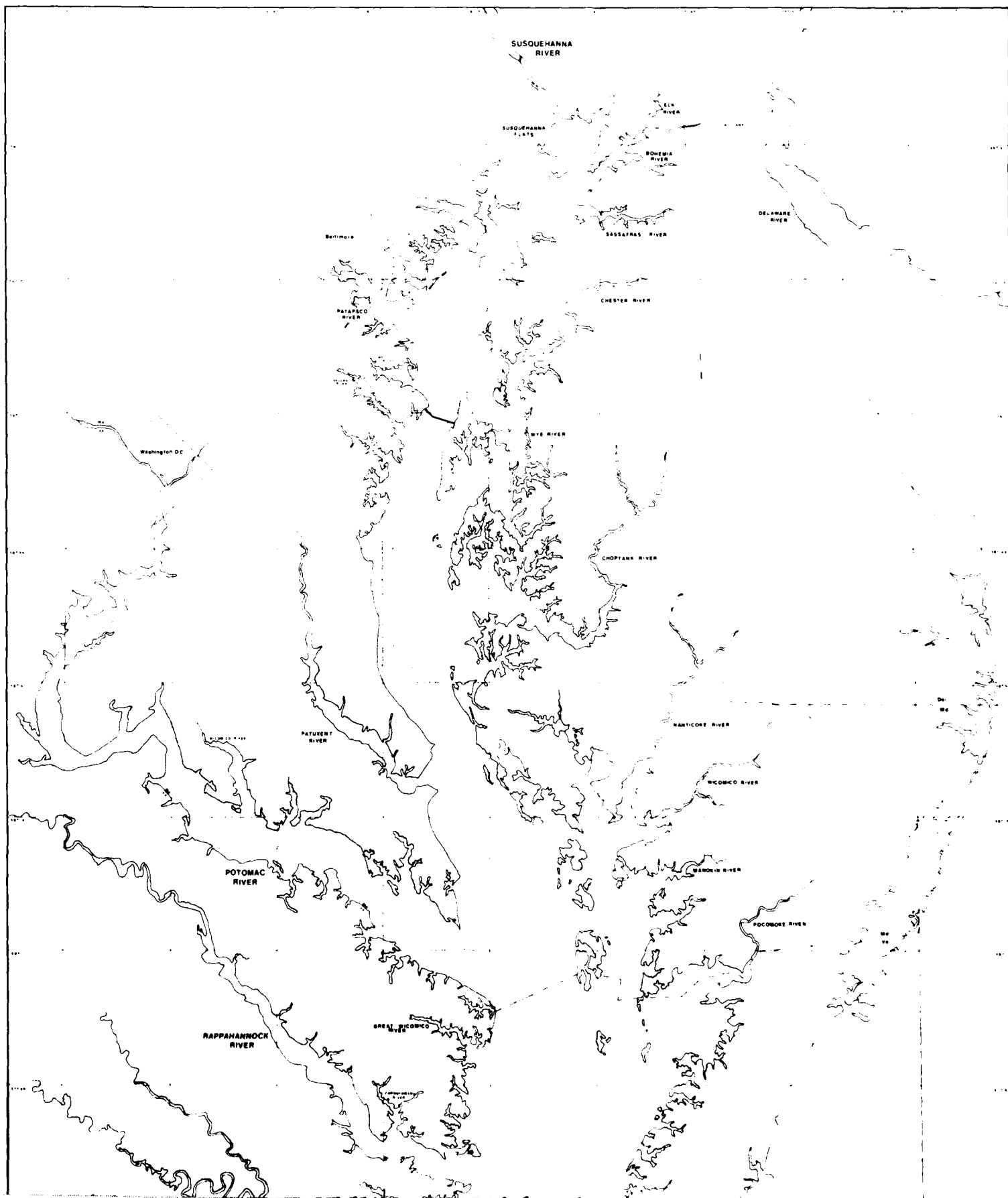
COE HYDRAULIC MODEL DATA

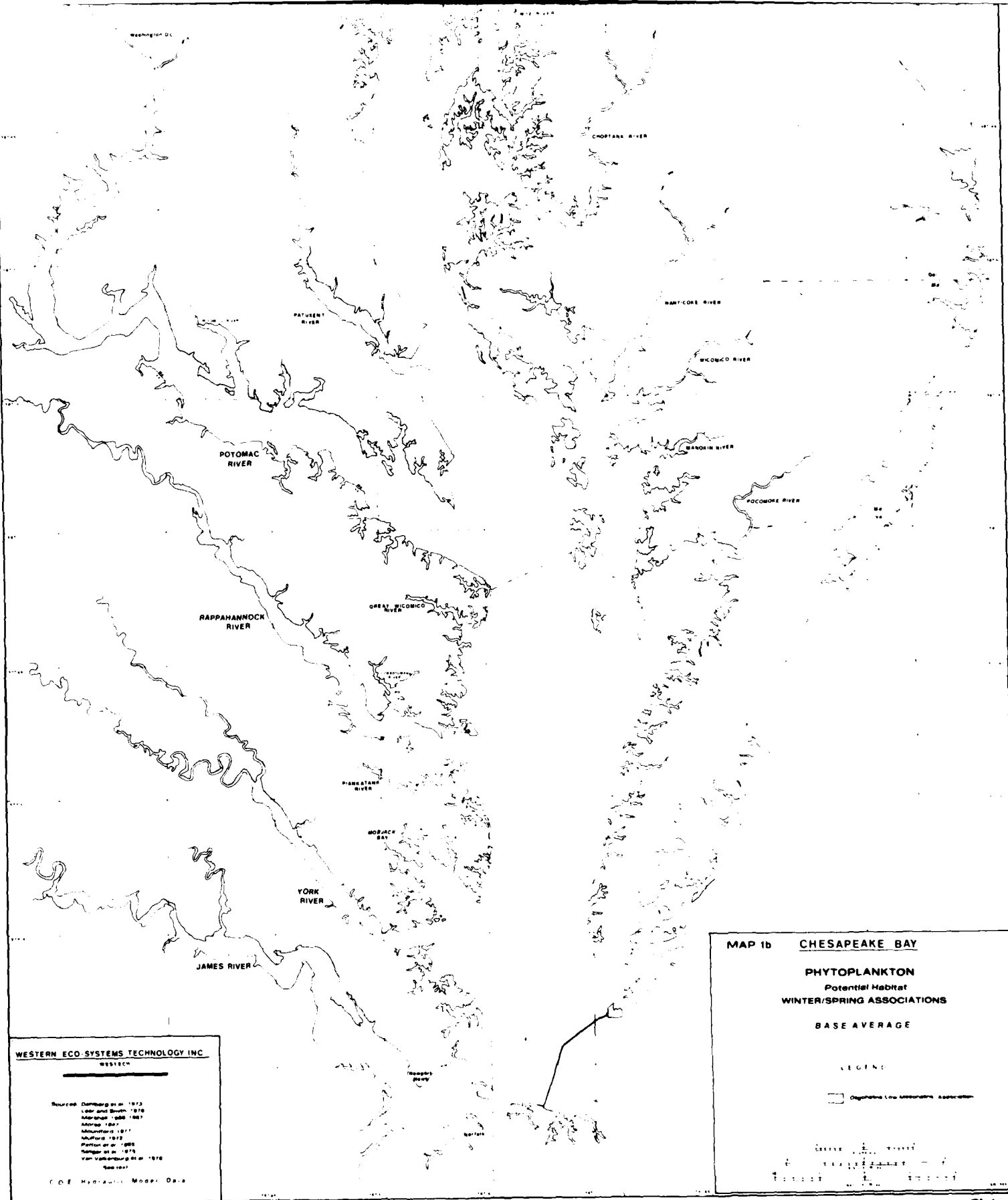
MAP 1b CHESAPEAKE BAY

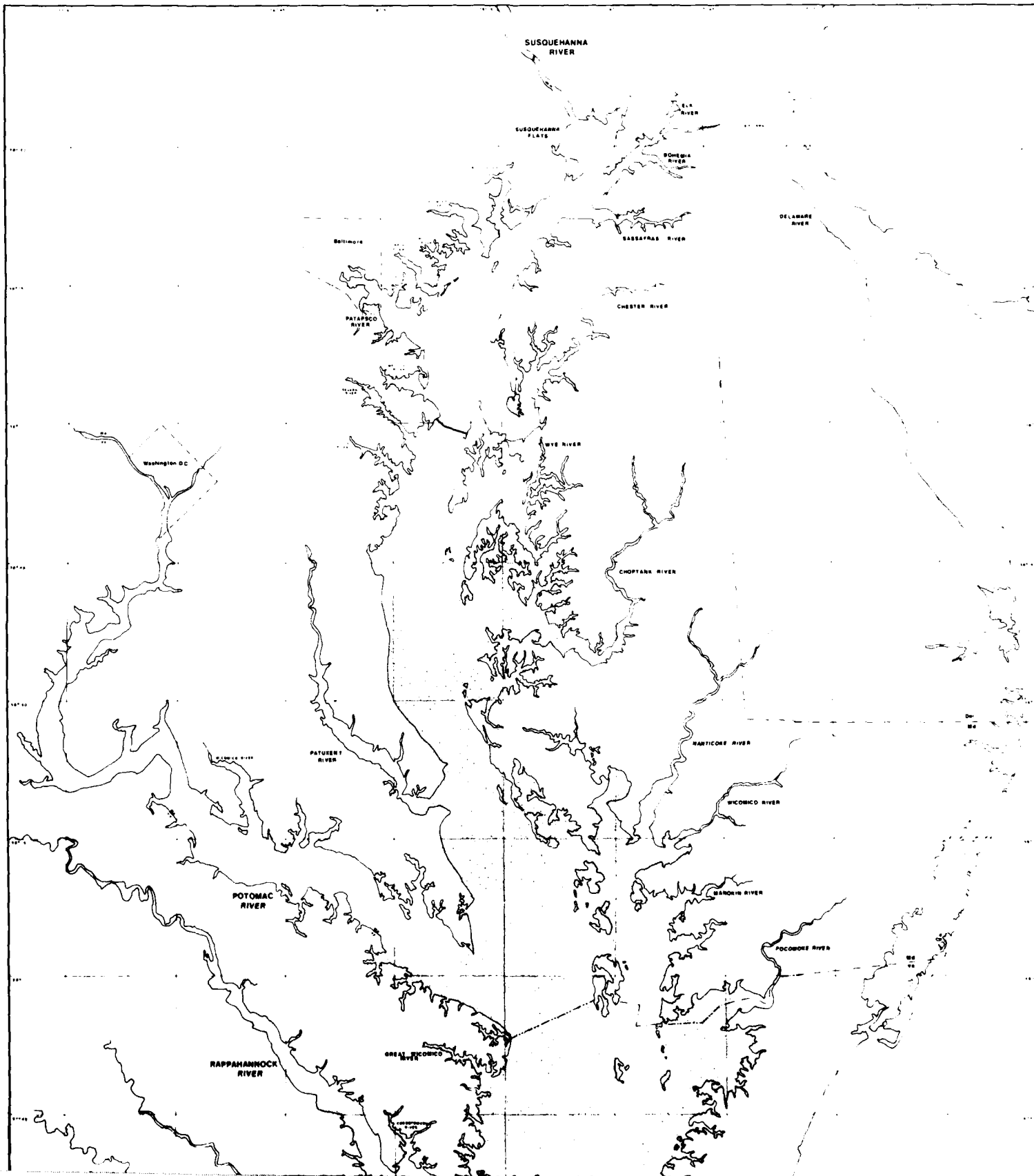
PHYTOPLANKTON
Potential Habitat
WINTER/SPRING ASSOCIATIONS
BASE AVERAGE

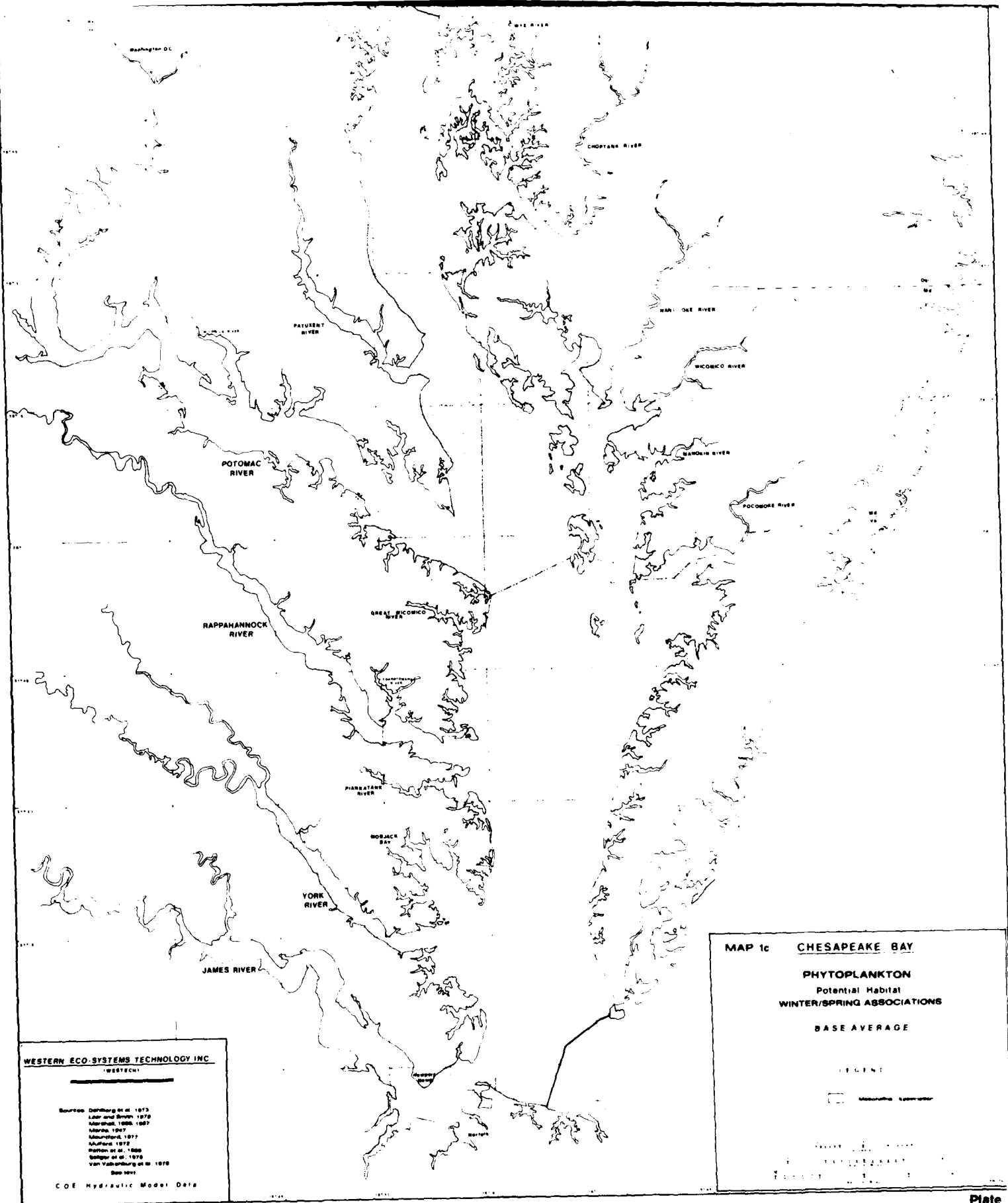
LEGEND

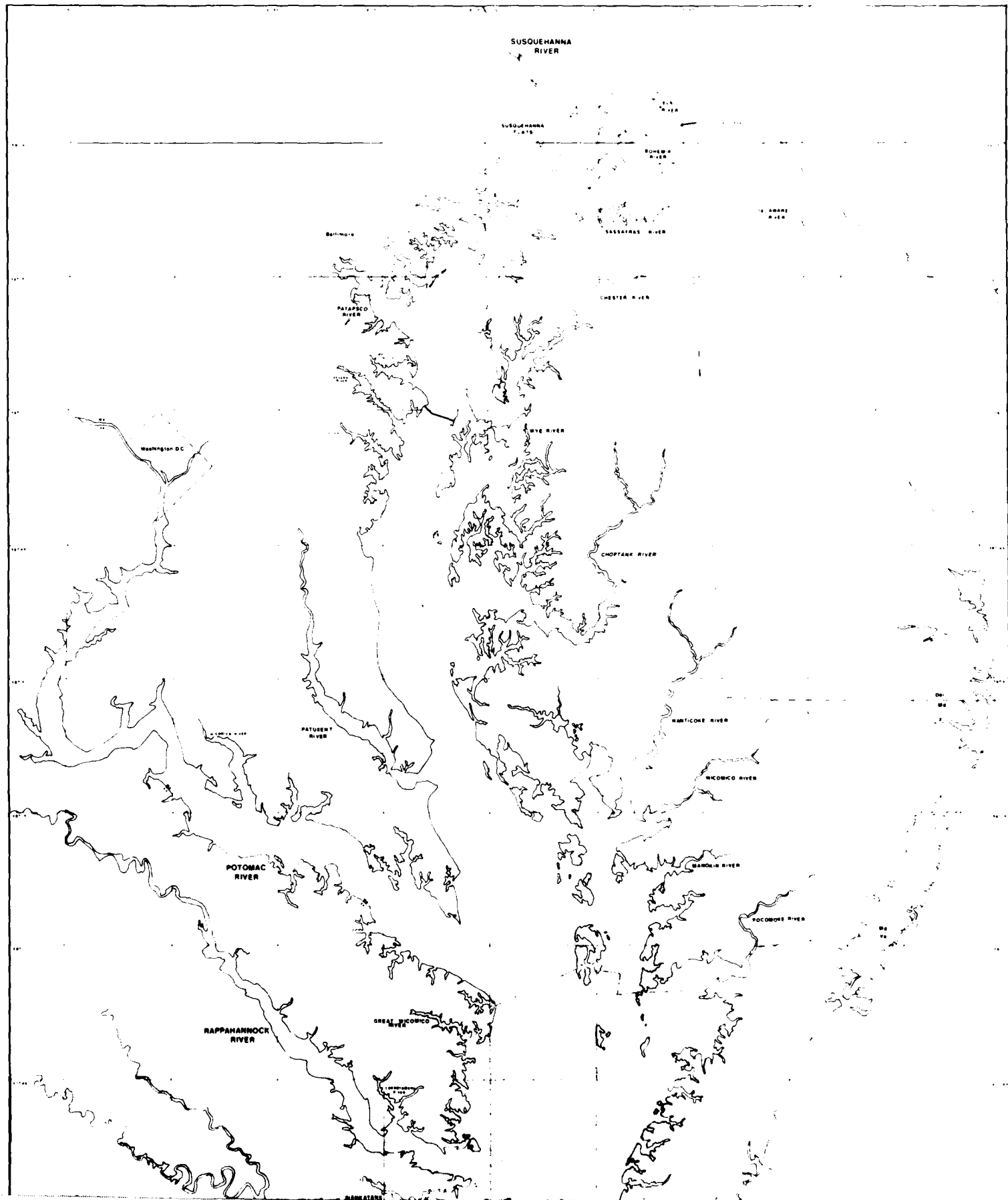
Top Phytoplankton Association

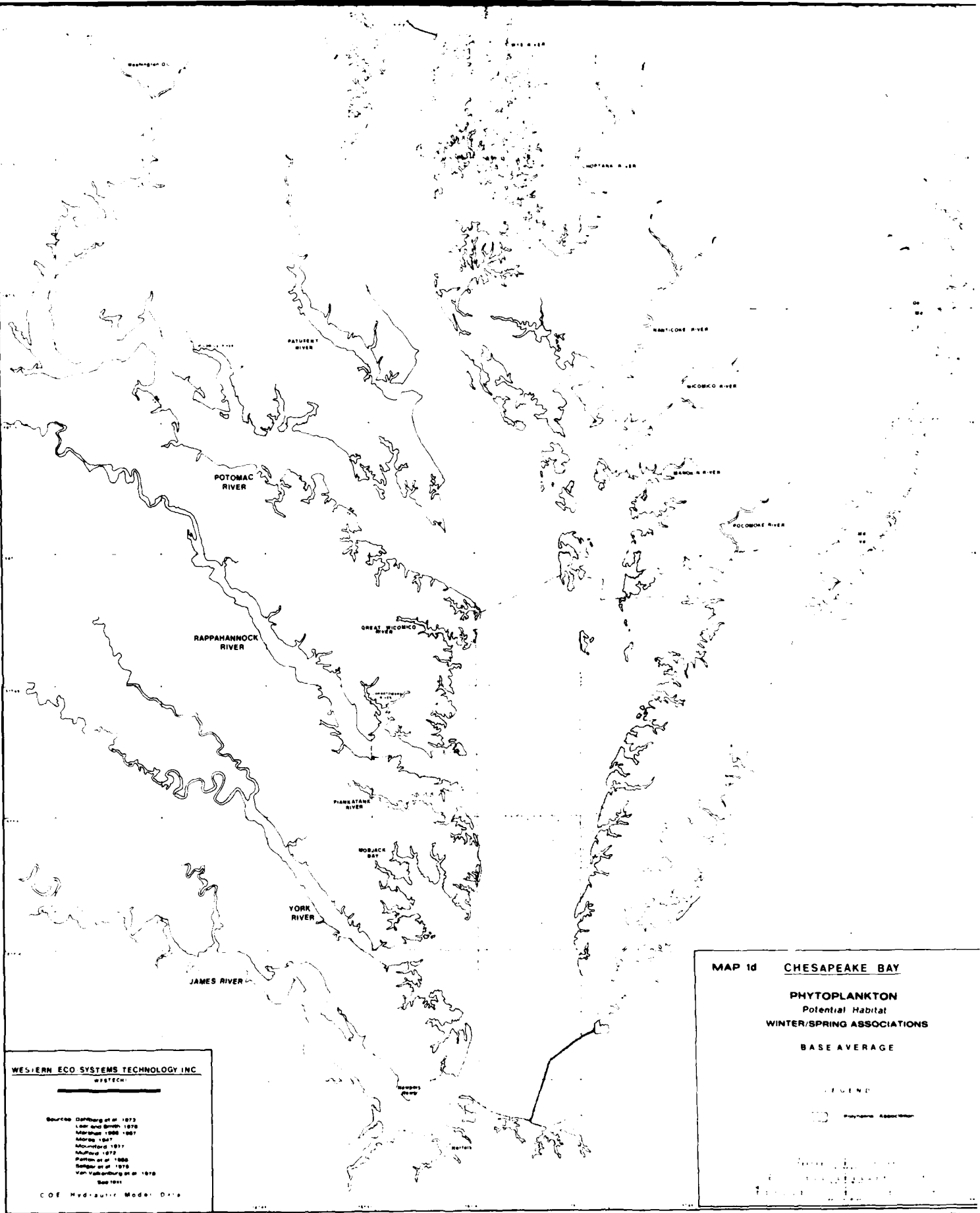


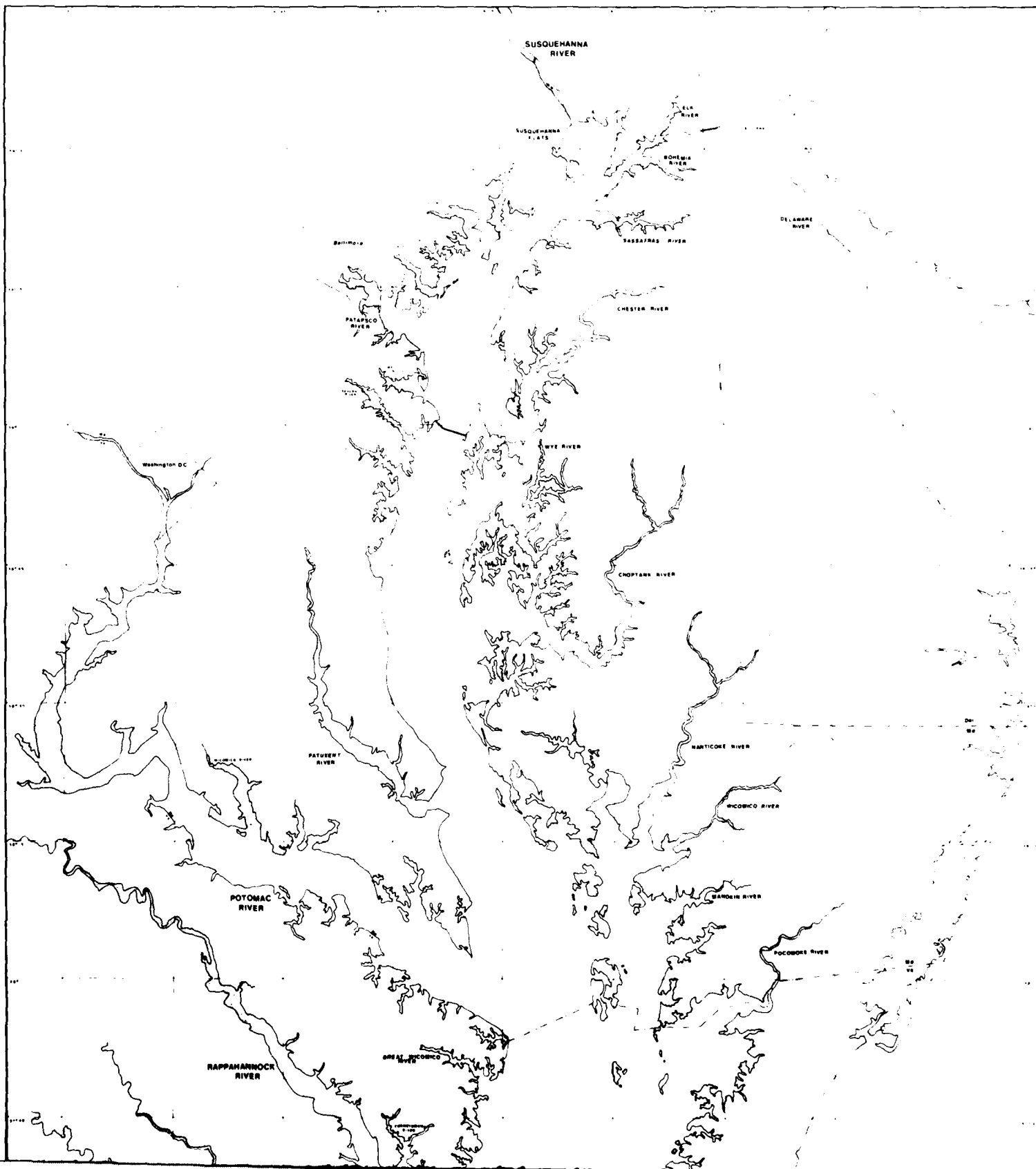


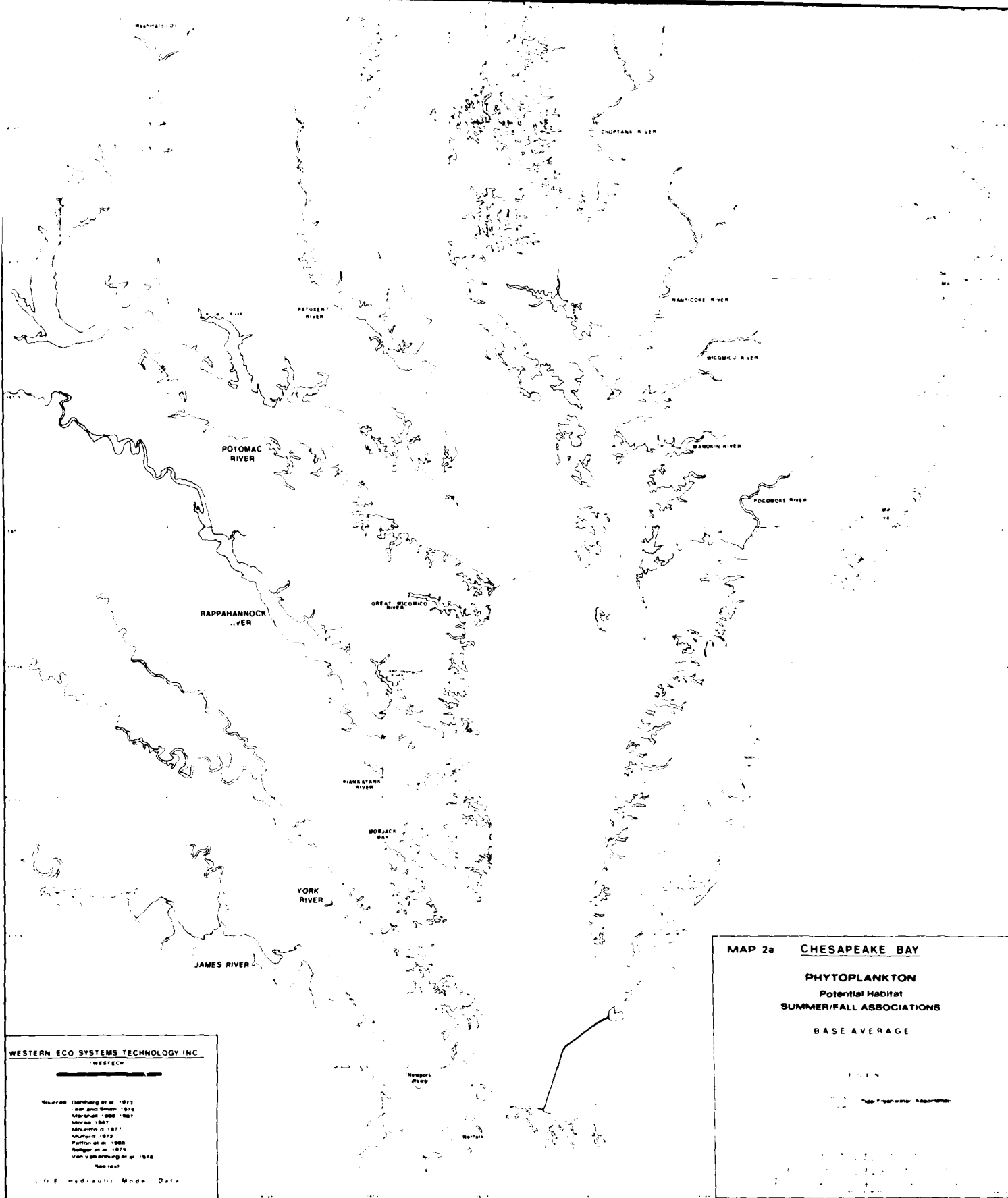












WESTERN ECO SYSTEMS TECHNOLOGY INC.
 WESTECH

Source: Dahlberg et al. 1971
 J. and Smith 1978
 Marsh 1988-1997
 Marsh 1997
 Kneib et al. 1977
 Kneib 1979
 Kneib et al. 1980
 Kneib et al. 1976
 Van Vleet et al. 1978
 Kneib 1997

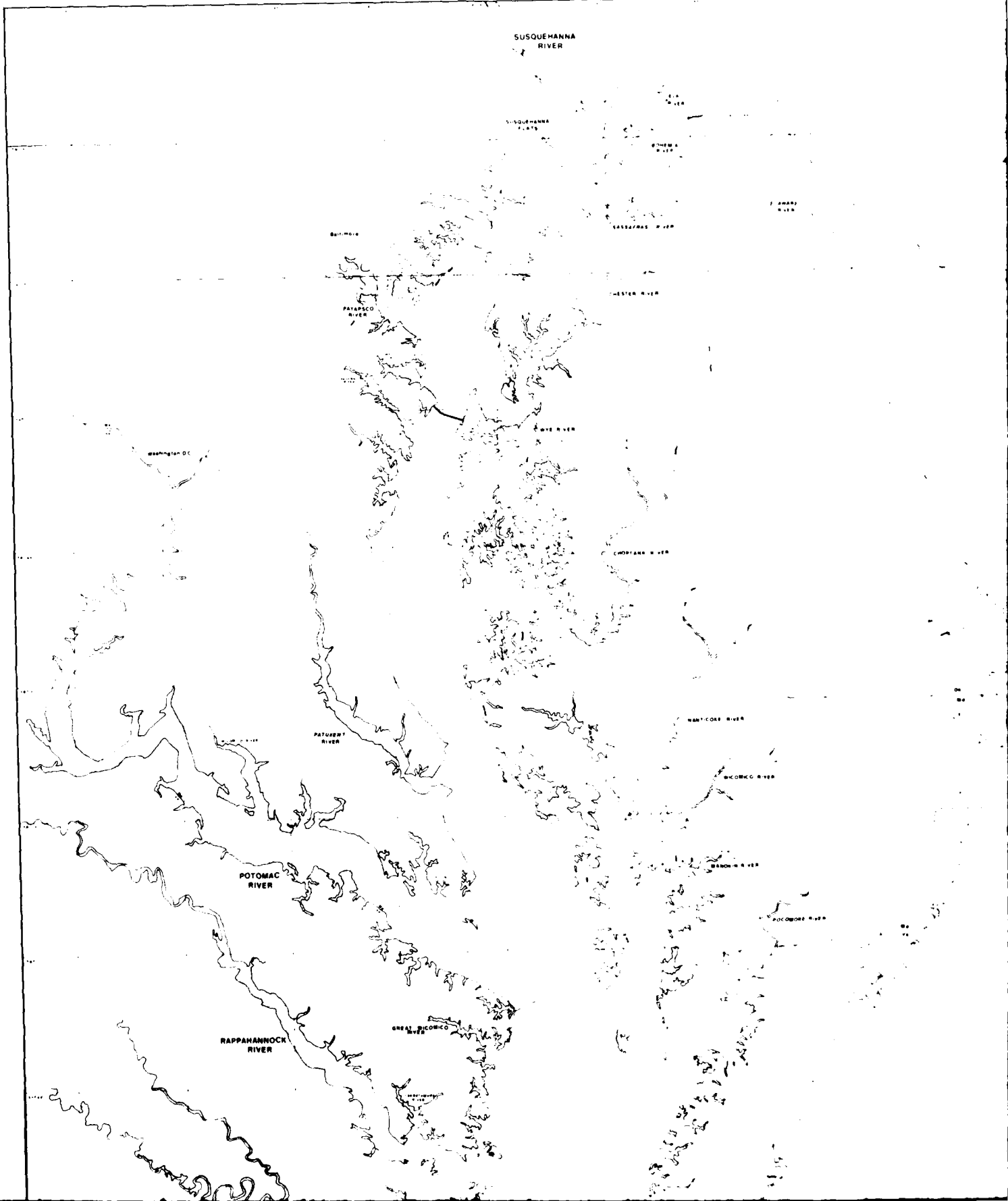
USE Hydraulic Model Data

MAP 2a CHESAPEAKE BAY

PHYTOPLANKTON
 Potential Habitat
 SUMMER/FALL ASSOCIATIONS
 BASE AVERAGE

Legend

Phytoplankton Association



SUSQUEHANNA
RIVER

SUSQUEHANNA
PLATE

ETHAM
RIVER

ANAS
RIVER

CHESAPEAKE
RIVER

Baltimore

CHESAPEAKE
RIVER

PATAPSCO
RIVER

JOE
RIVER

WASHINGTON
D.C.

CHESAPEAKE
RIVER

WATKINS
RIVER

PATAPSCO
RIVER

ROANOKE
RIVER

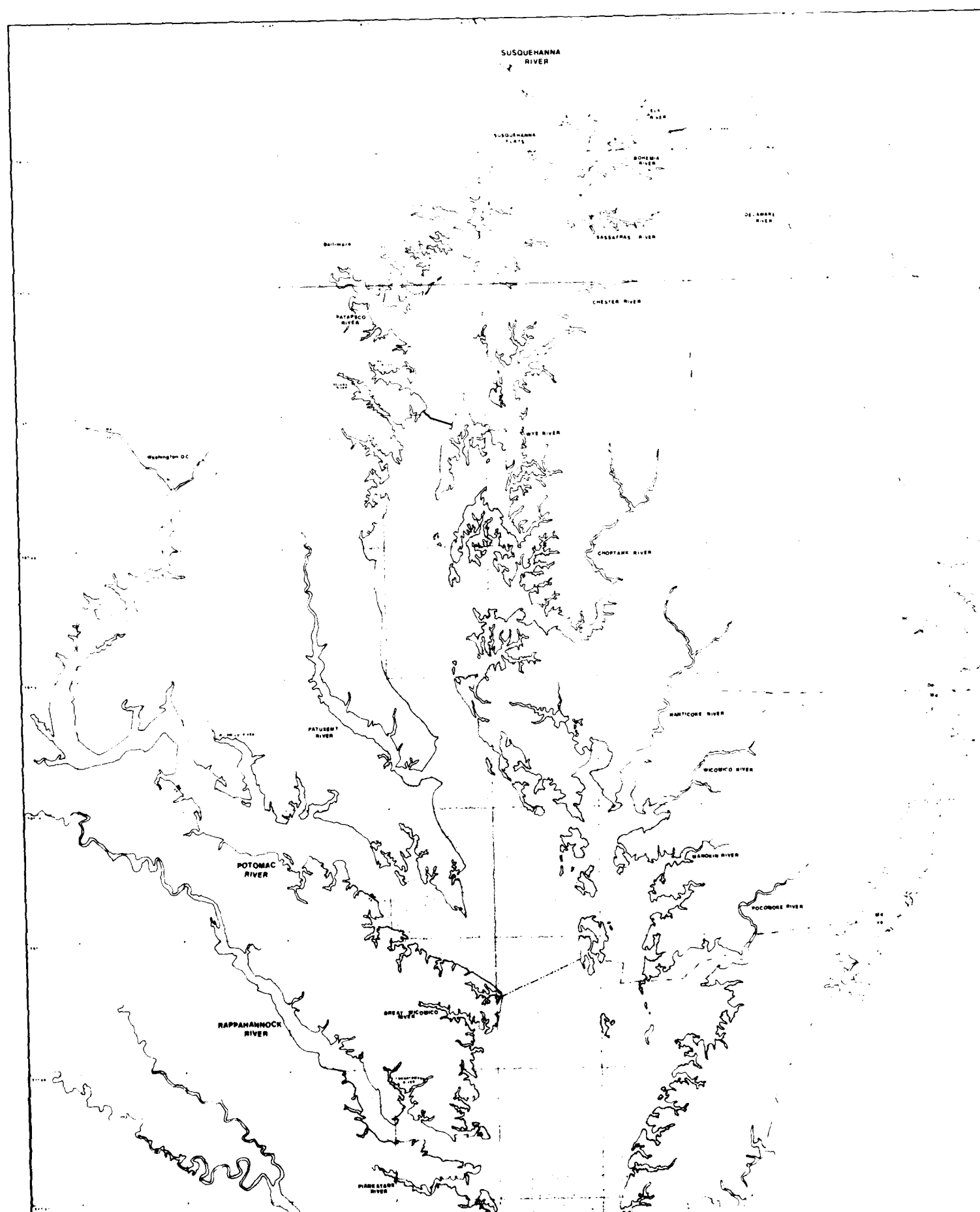
POTOMAC
RIVER

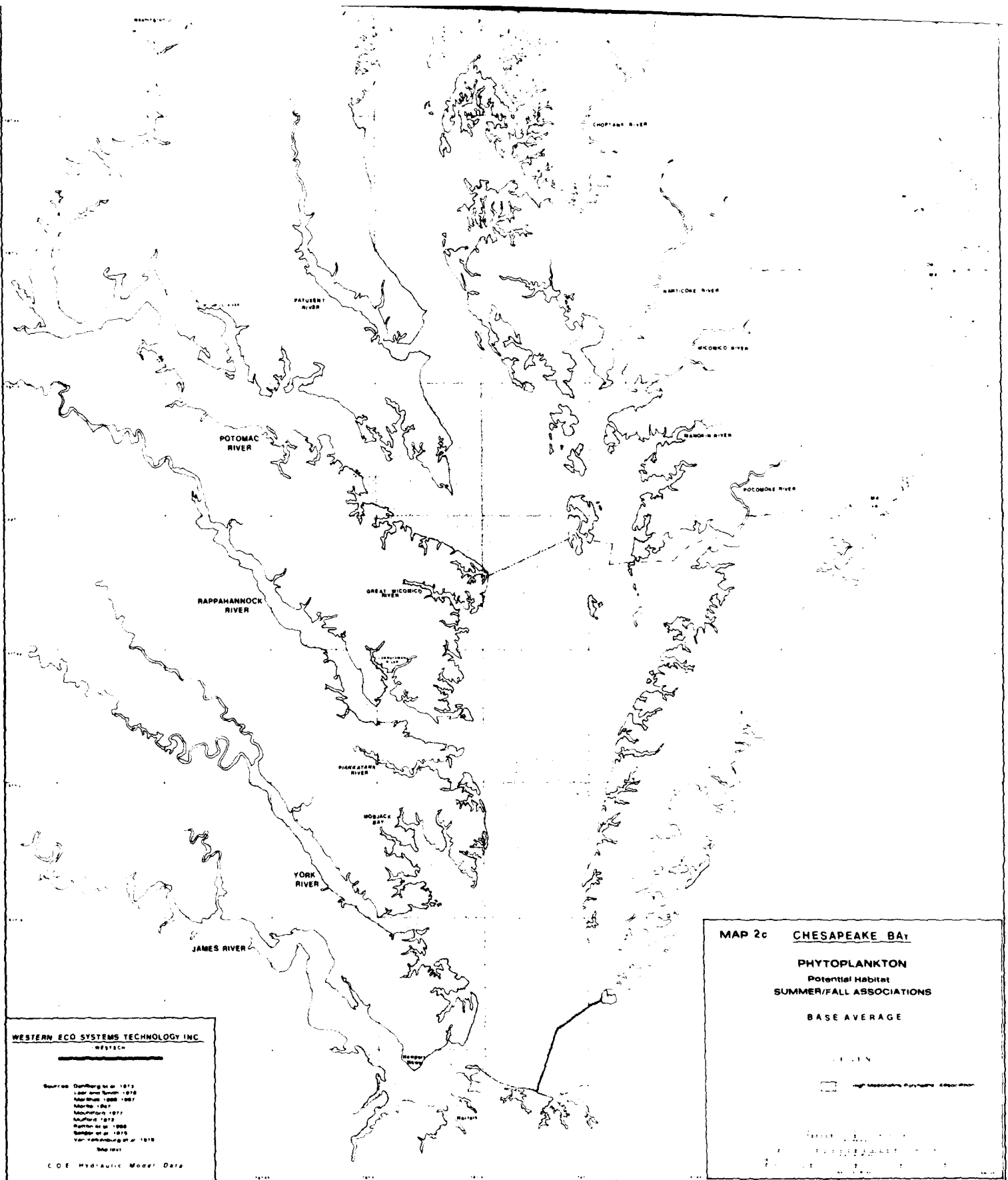
ROANOKE
RIVER

ROANOKE
RIVER

RAPPAHANNOCK
RIVER

ROANOKE
RIVER





SUSQUEHANNA RIVER

SUSQUEHANNA FLATS

ELLS
RIVER

BOHEMA
RIVER

DELAWARE
RIVER

SASSAFRAS RIVER

BALTIMORE

CHESTER RIVER

PATAPSCO RIVER

WYE RIVER

WASHINGTON DC

CHOPTANK RIVER

NANTICONE RIVER

PATUXENT RIVER

WICOMICO RIVER

POTOMAC RIVER

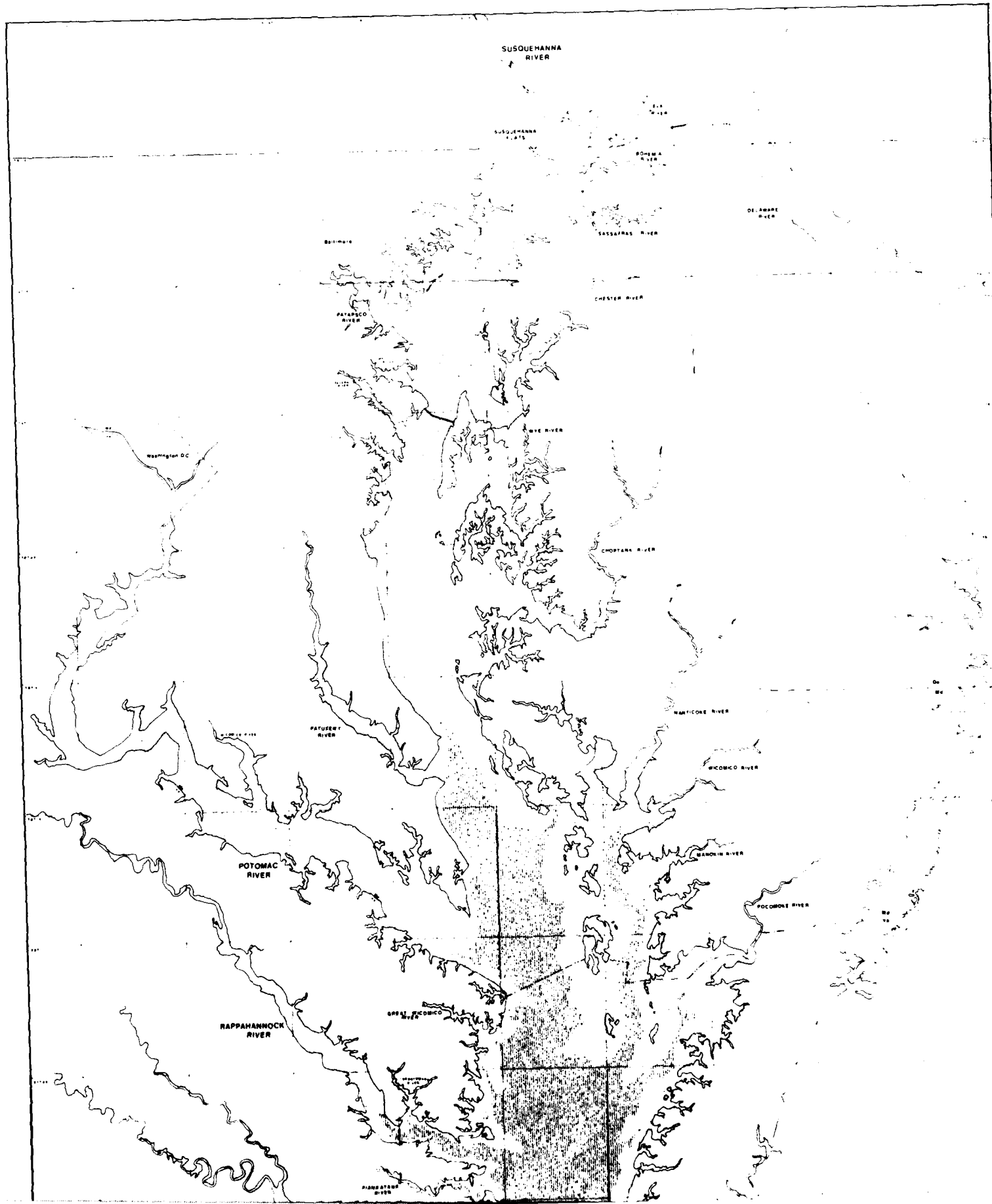
BRANCH RIVER

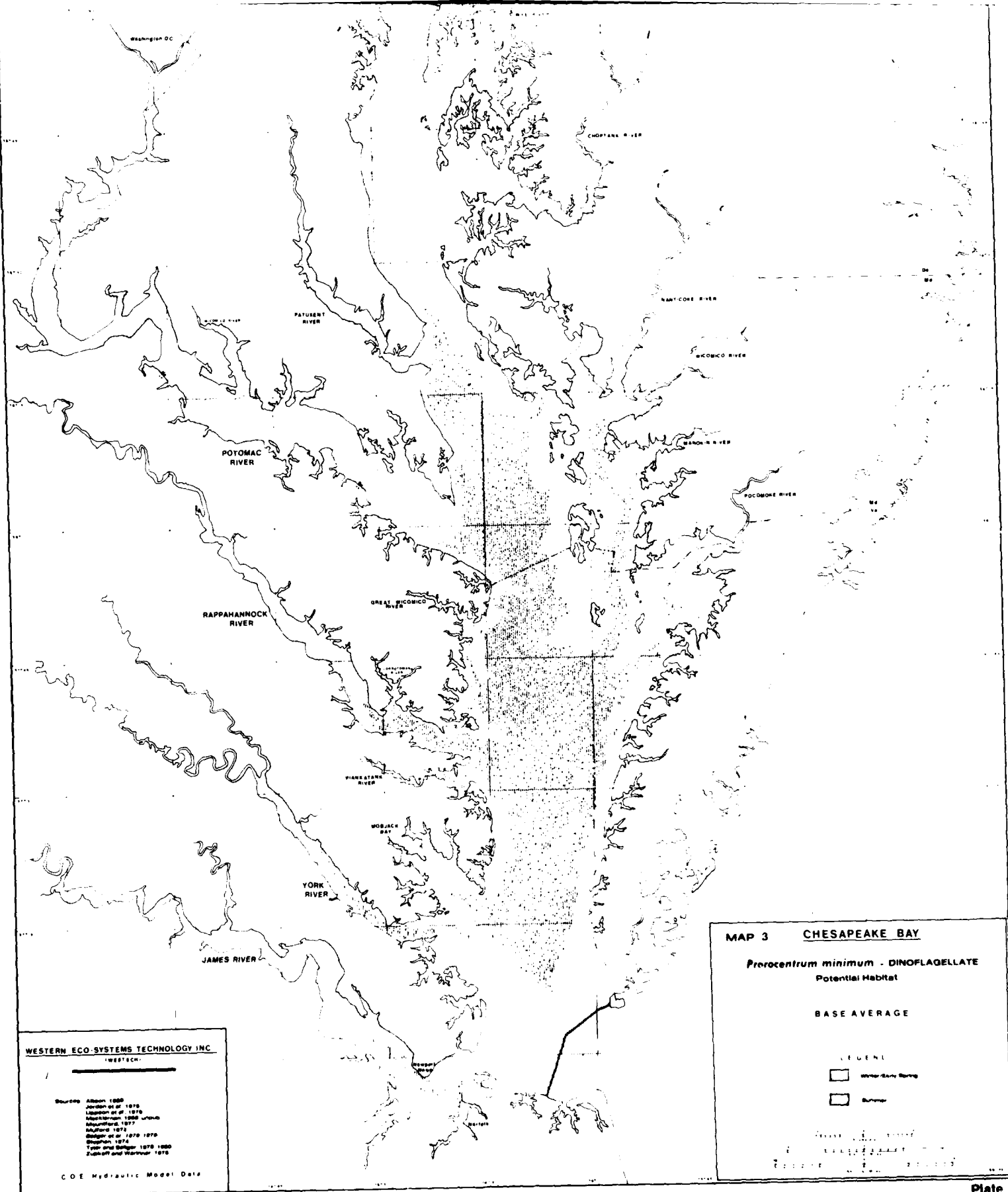
POCOMO RIVER

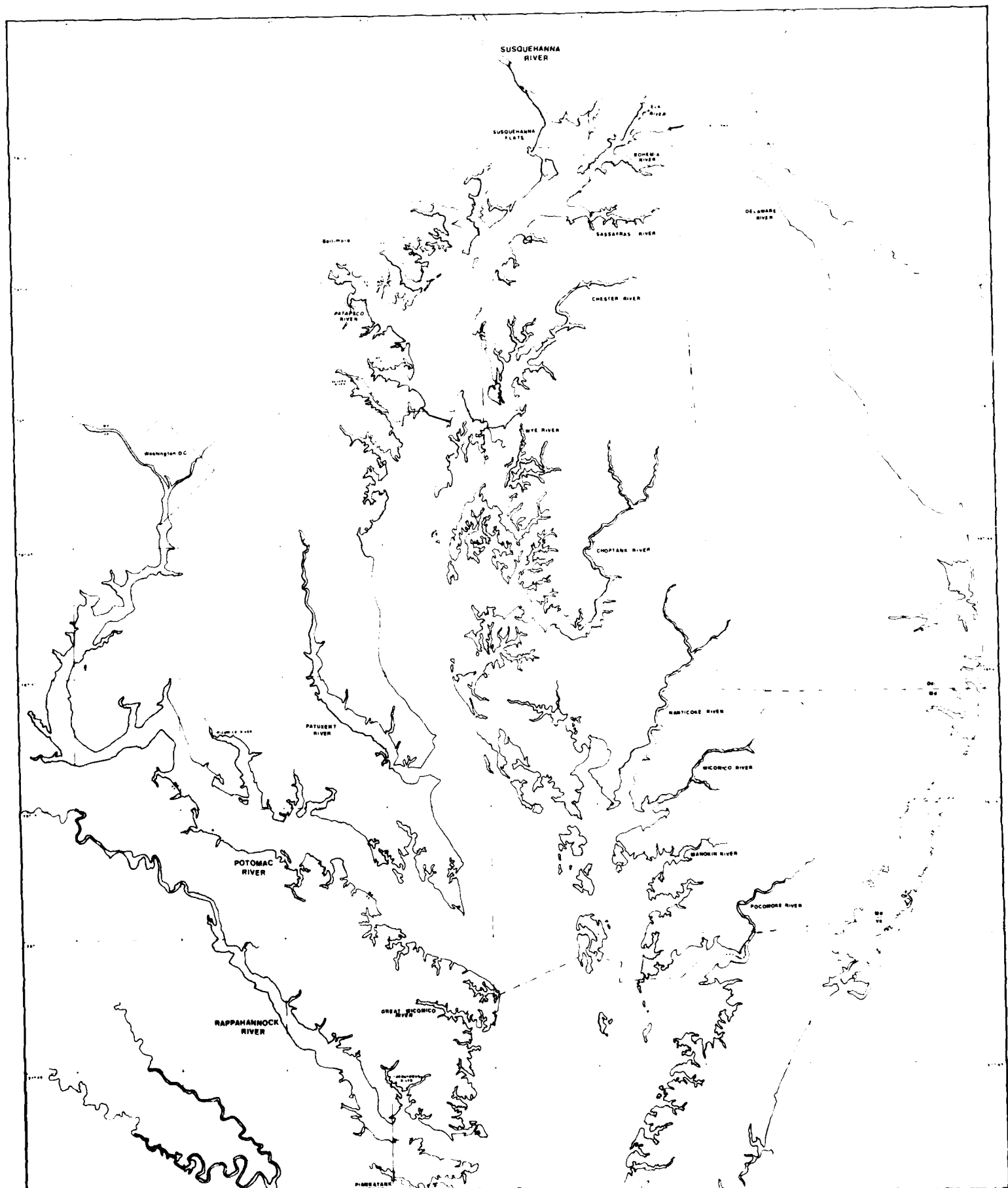
RAPPAHANNOCK RIVER

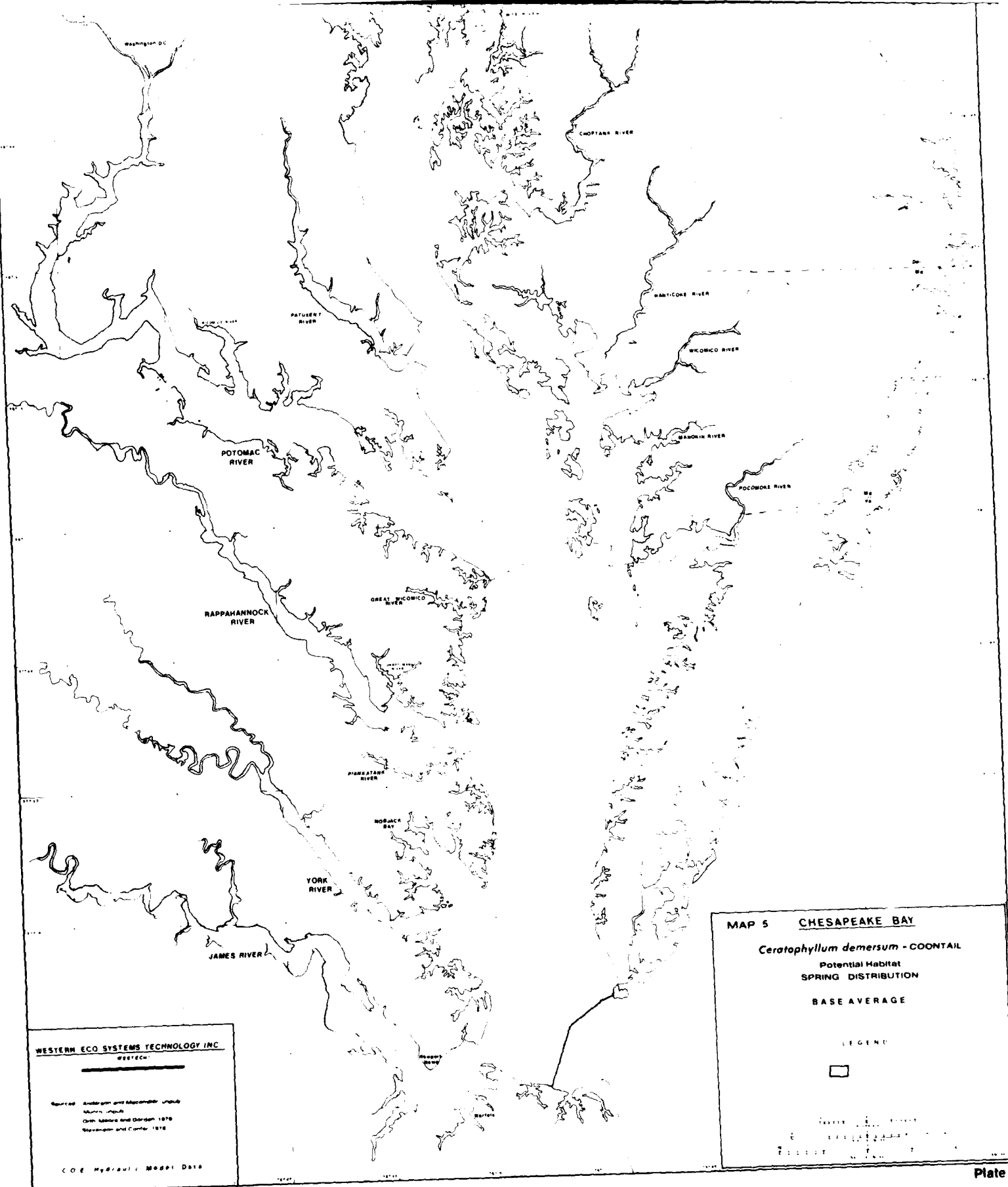
ORRAL WICOMICO RIVER

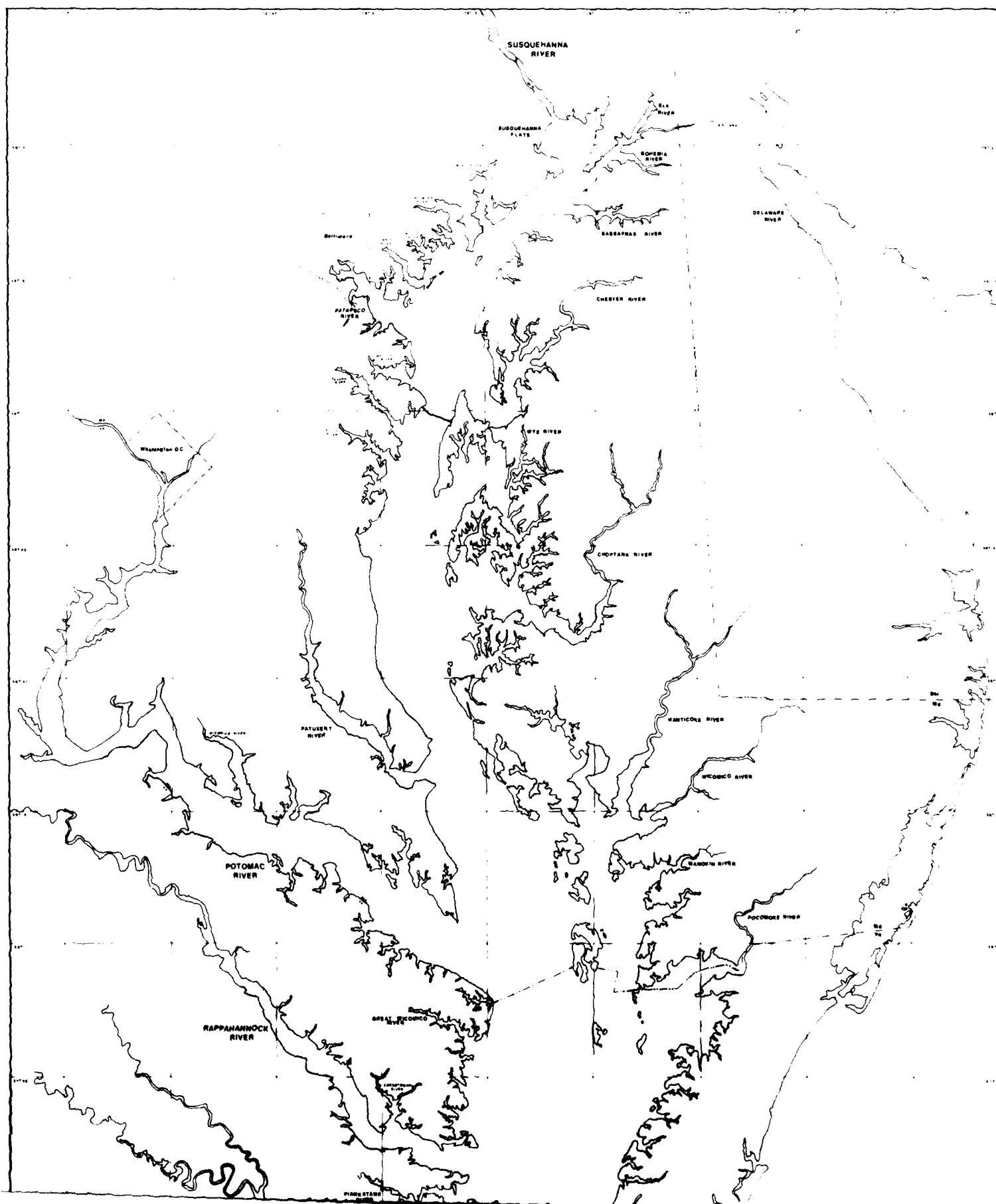
PIANOSTON RIVER

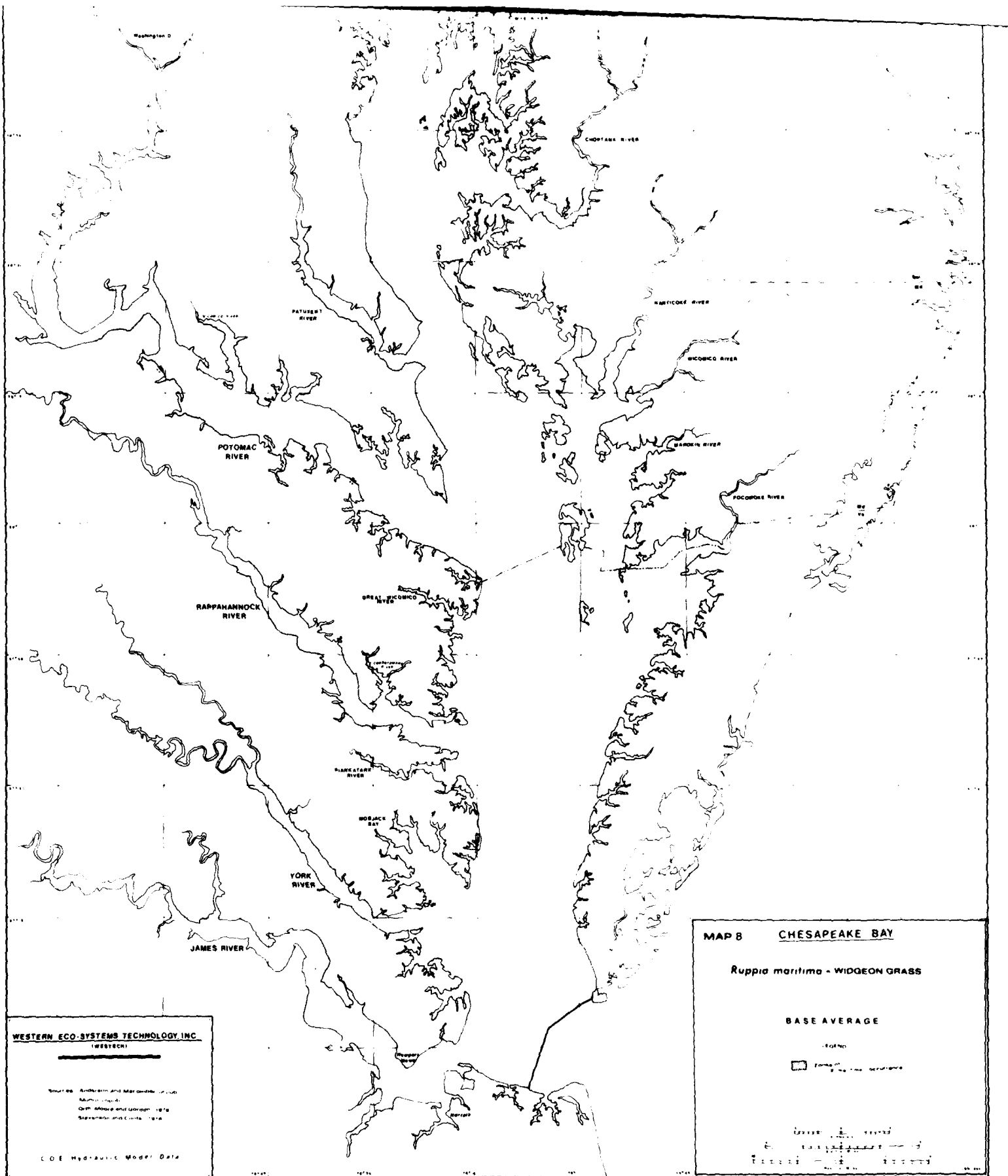


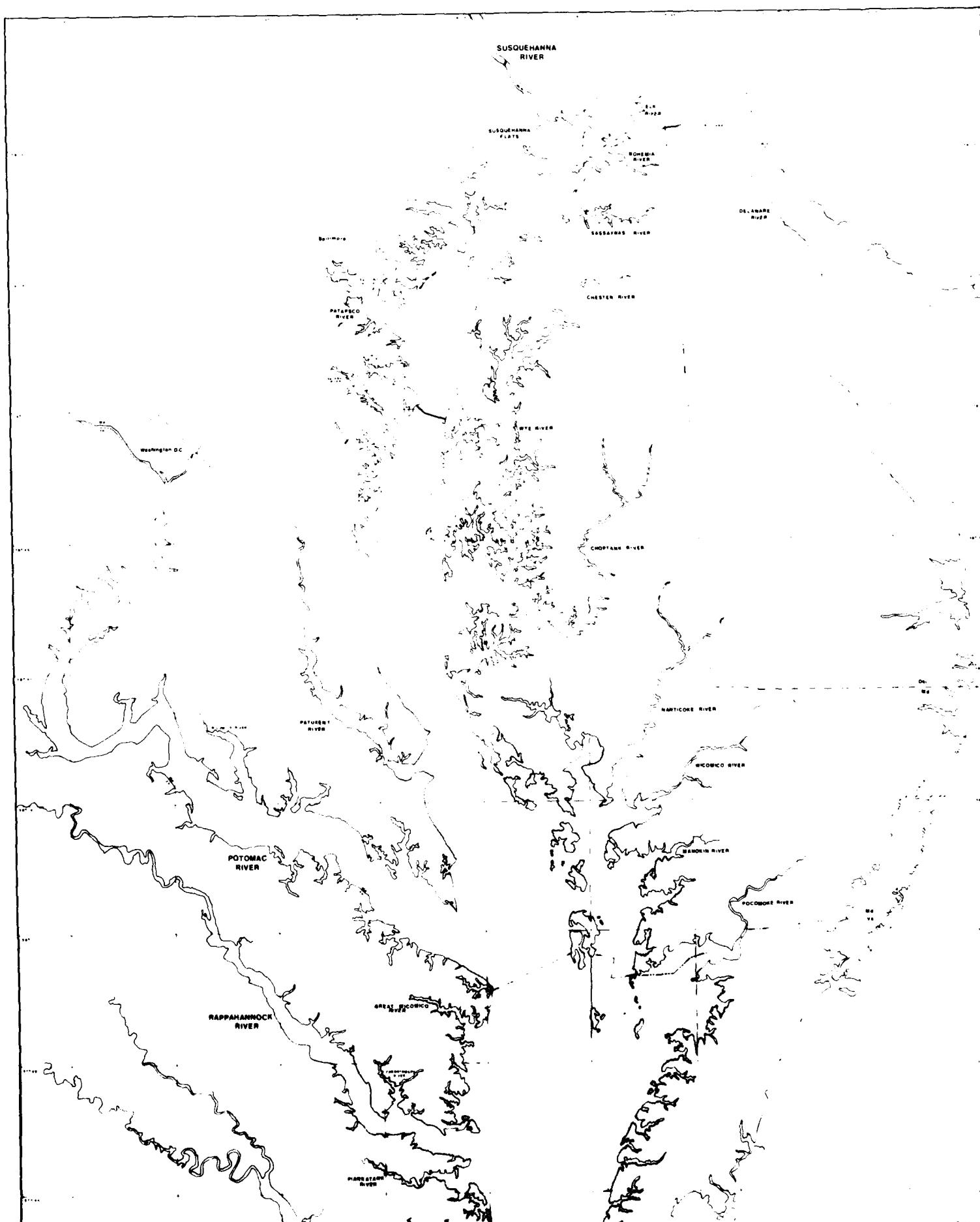


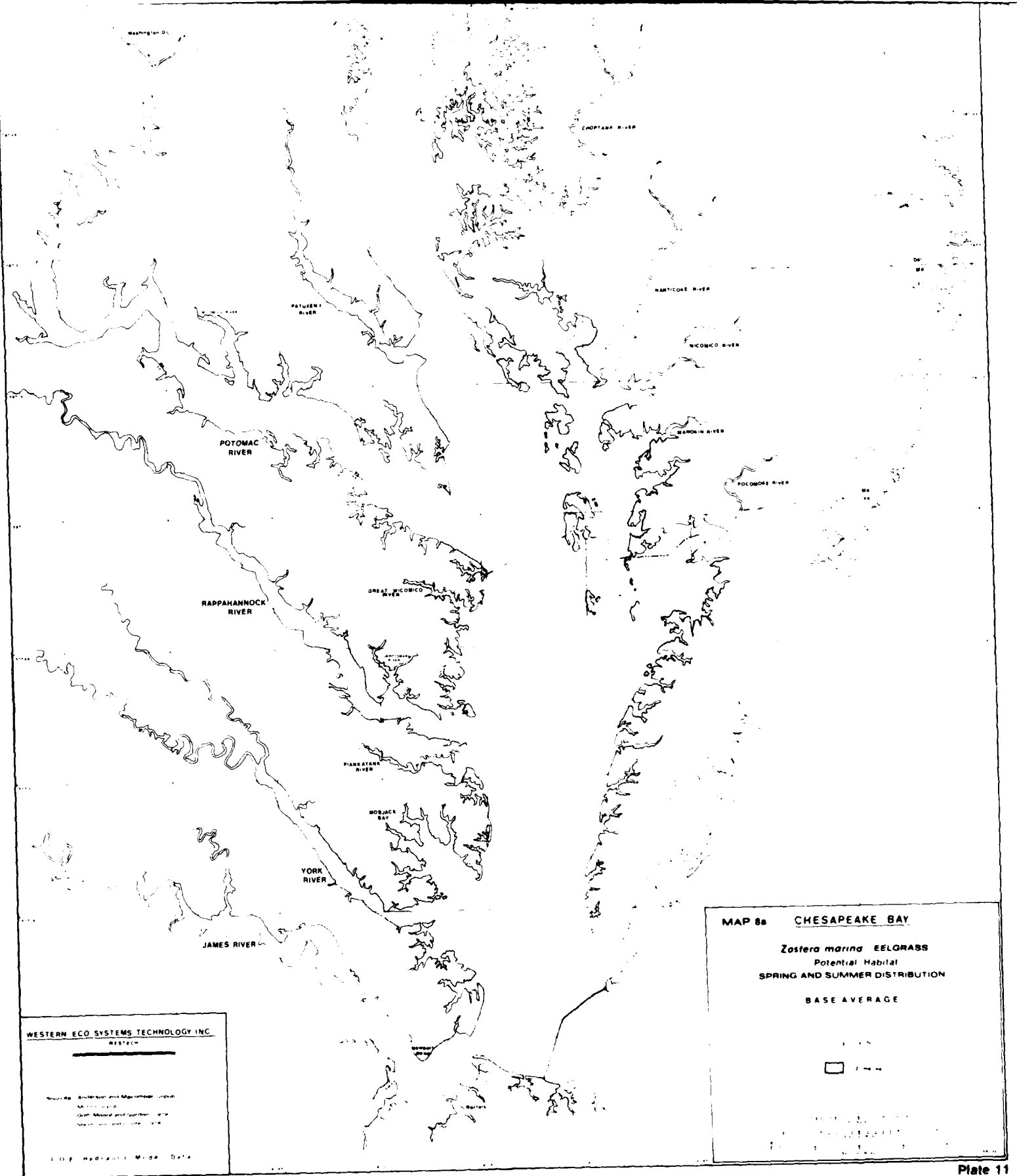


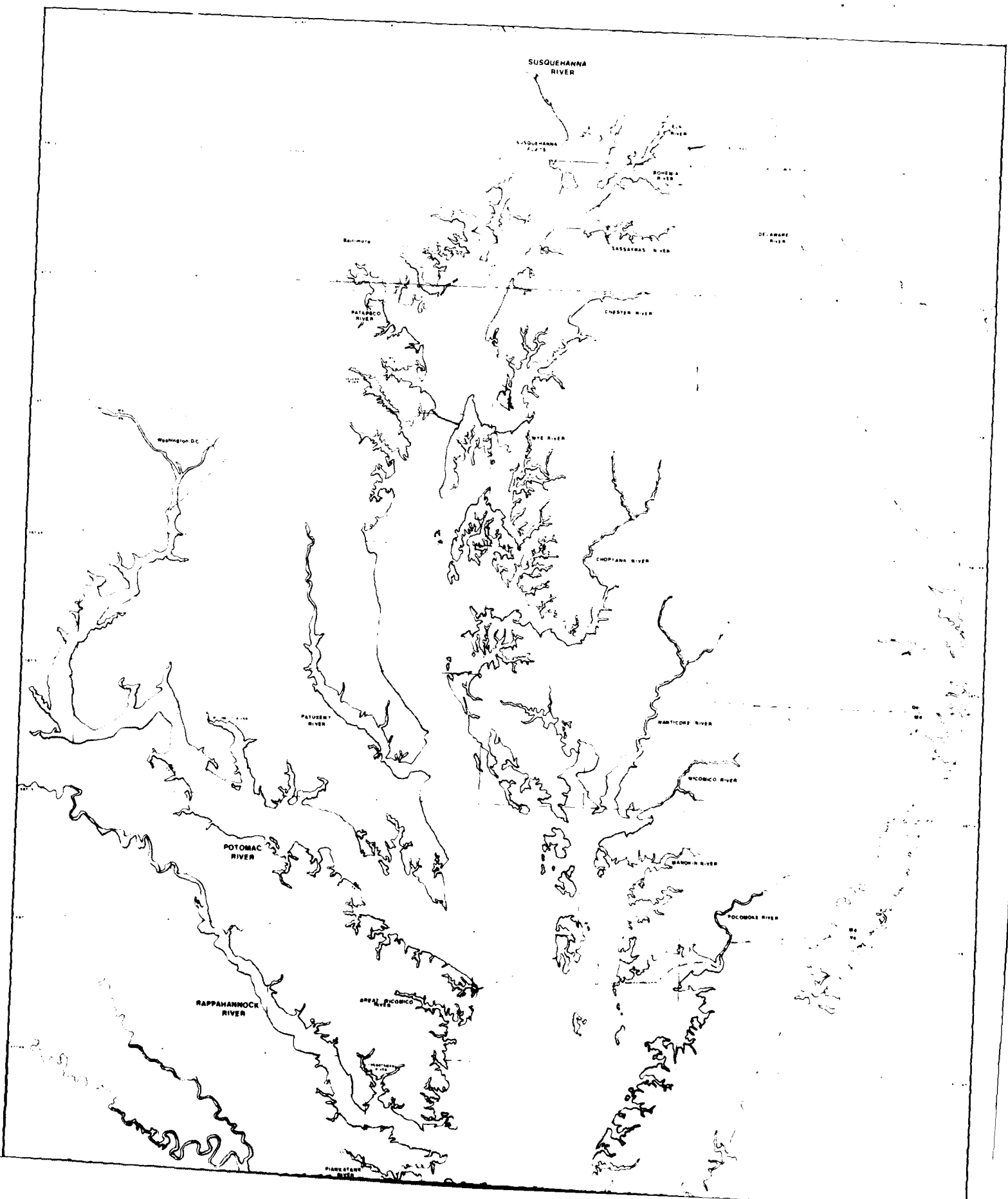


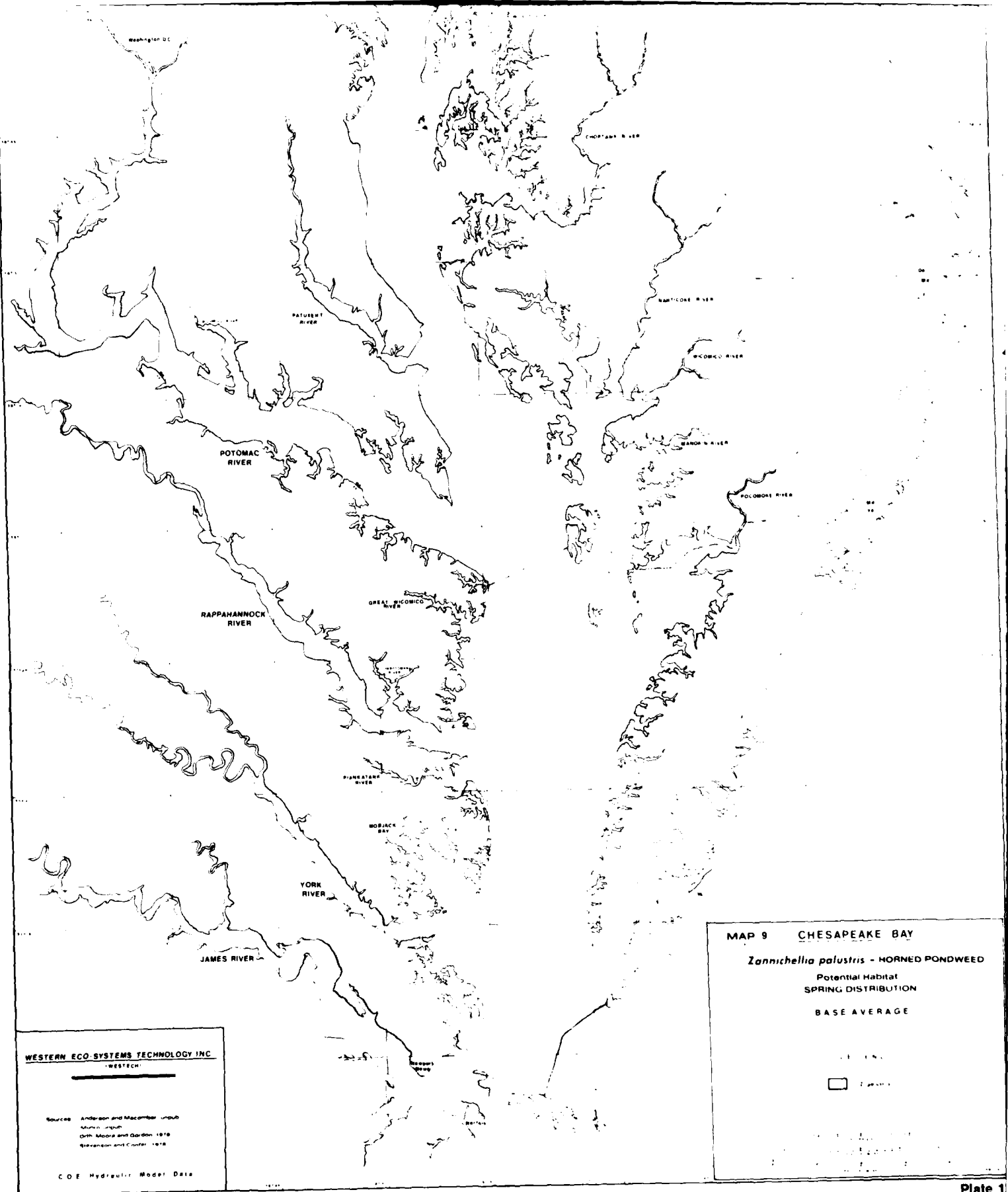


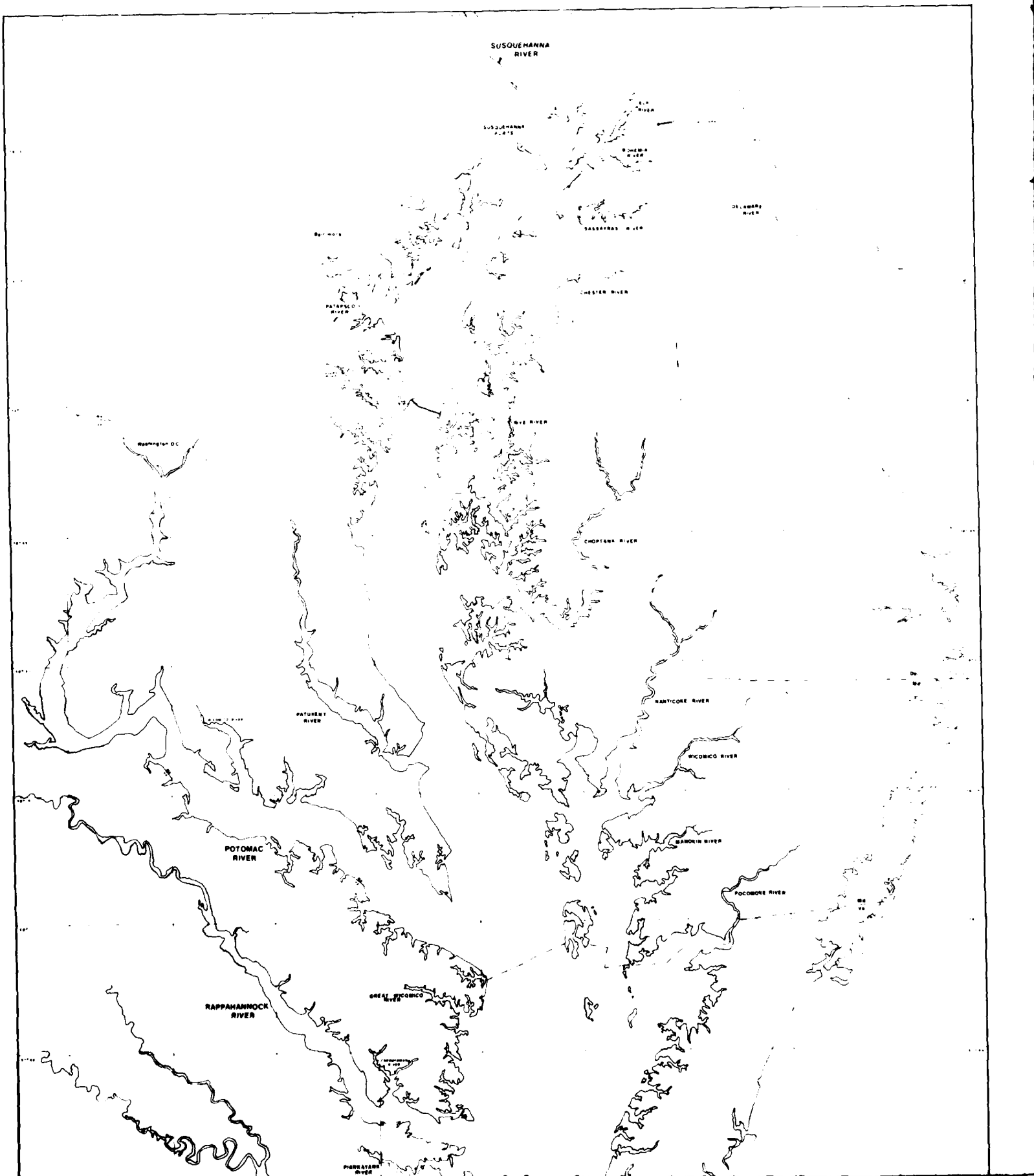




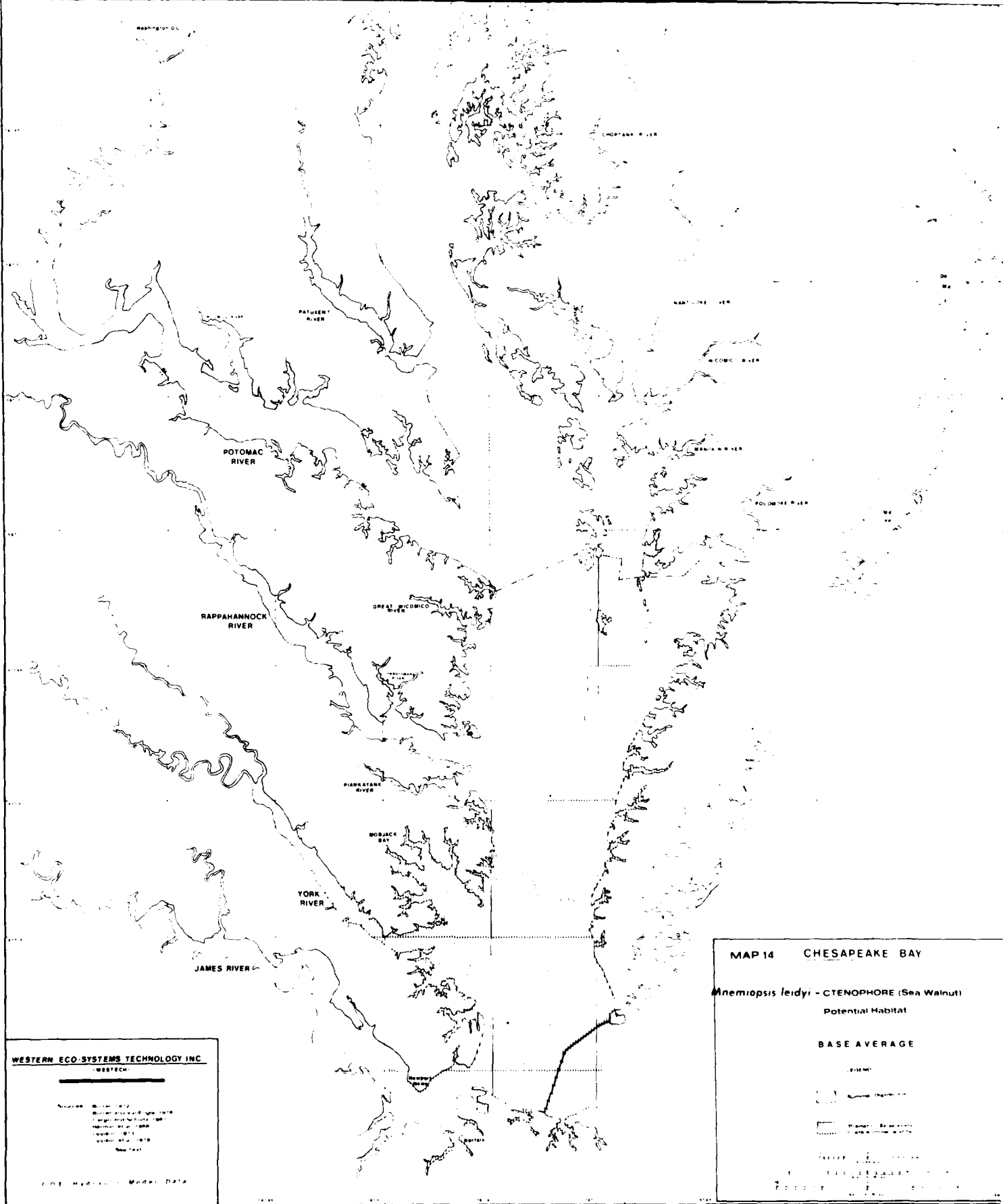












SUSQUEHANNA RIVER

SUSQUEHANNA PLATEAU

BOHemia River

DELAWARE River

SASSERMAN River

Baltimore

CHESTER River

PATAPSCO River

ELBE River

HOPTANG River

NANTICORE River

WICOMICO River

MANONIN River

POCOMORE River

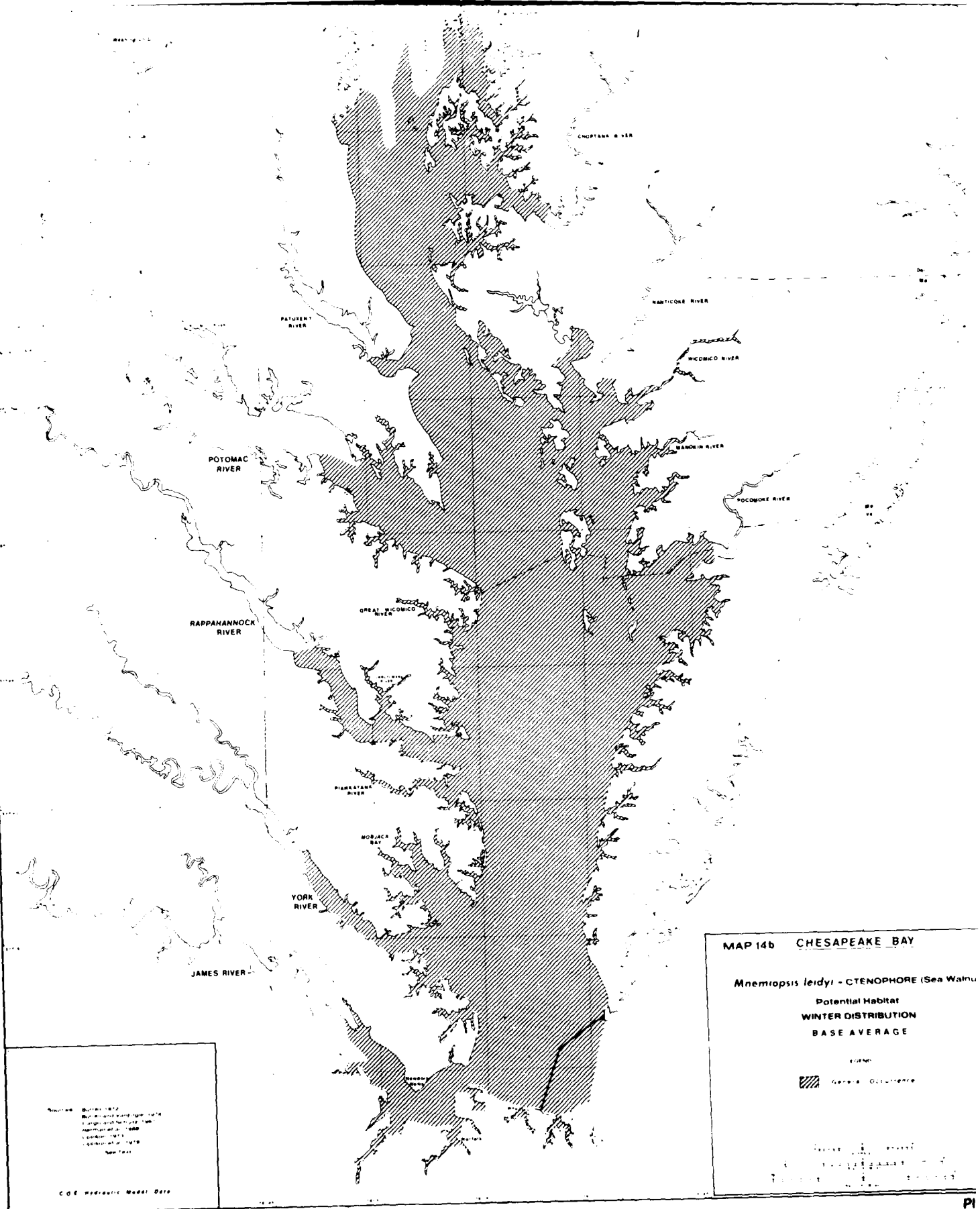
POTOMAC RIVER

RAPPAHANNOCK RIVER

GREY WICOMICO RIVER

PIANSTATON RIVER





SUSQUEHANNA RIVER

SUSQUEHANNA PLATS

ELA RIVER

ROHEIA RIVER

DELAWARE RIVER

SASSAPARAS RIVER

BALTIMORE

PATAPSCO RIVER

CHESTER RIVER

WYE RIVER

WASHINGTON D.C.

CHOPTANK RIVER

PATUXENT RIVER

HANTICORE RIVER

WICOMICO RIVER

POTOMAC RIVER

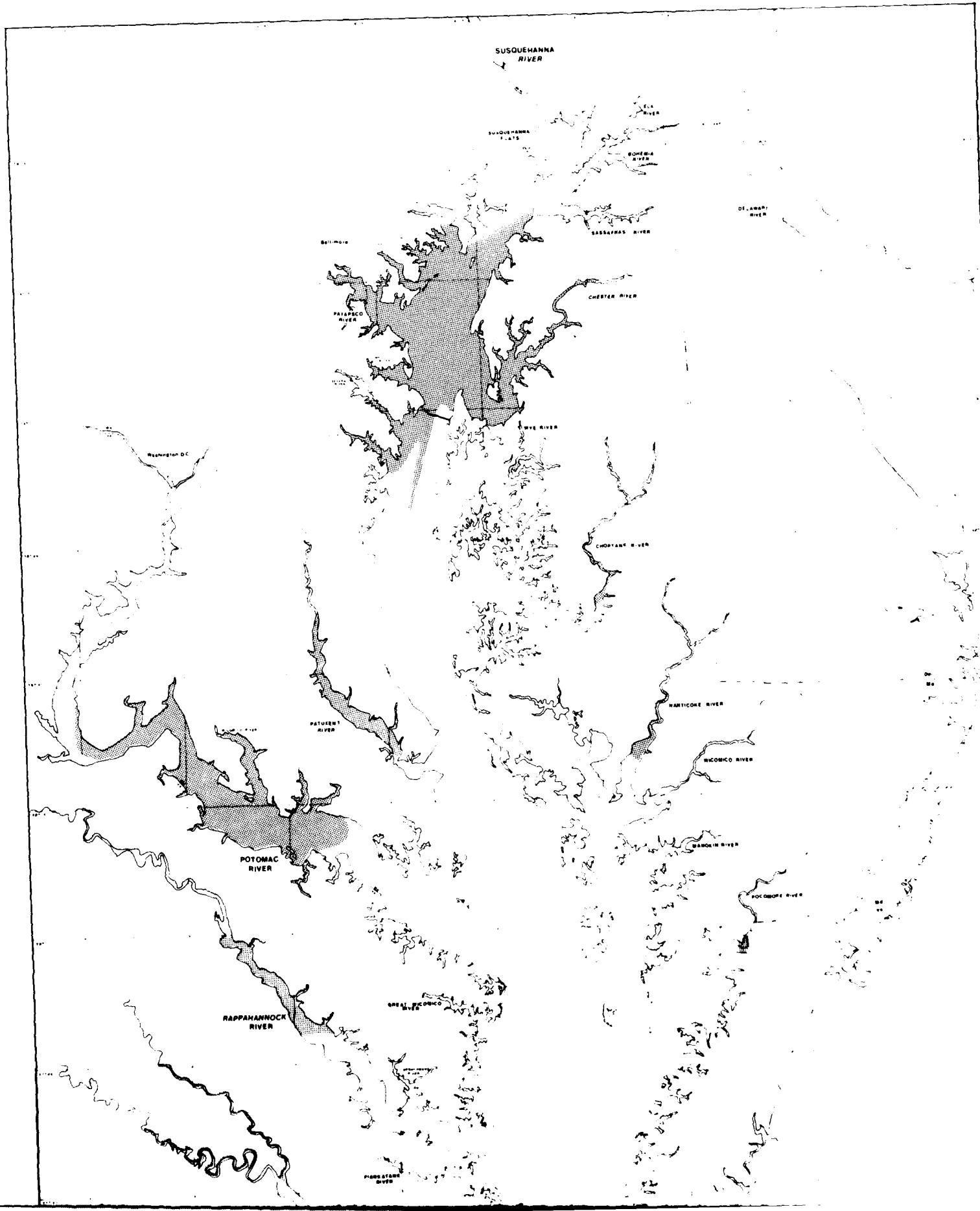
BARBOLIN RIVER

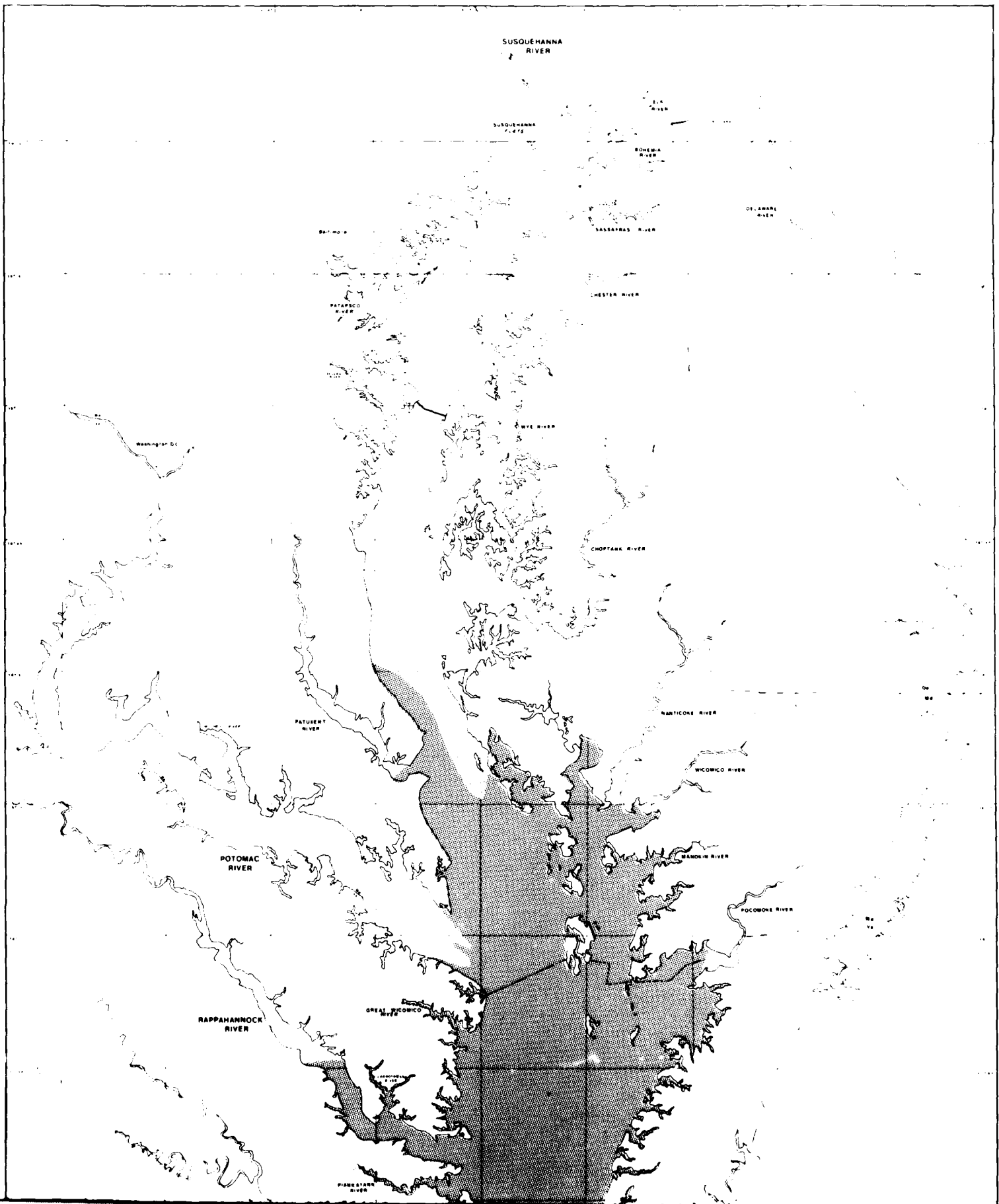
POCOMORE RIVER

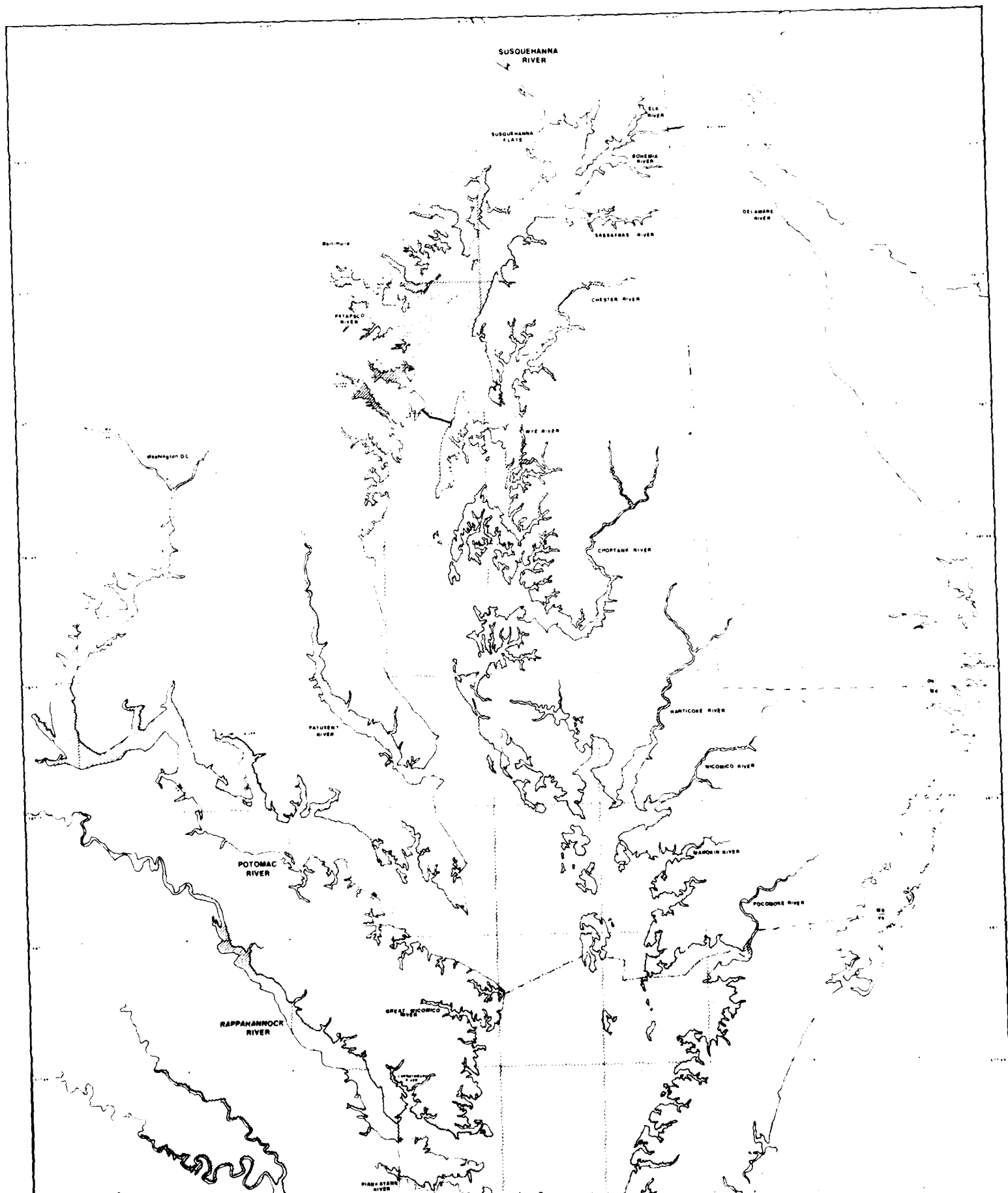
RAPPANANNOCK RIVER

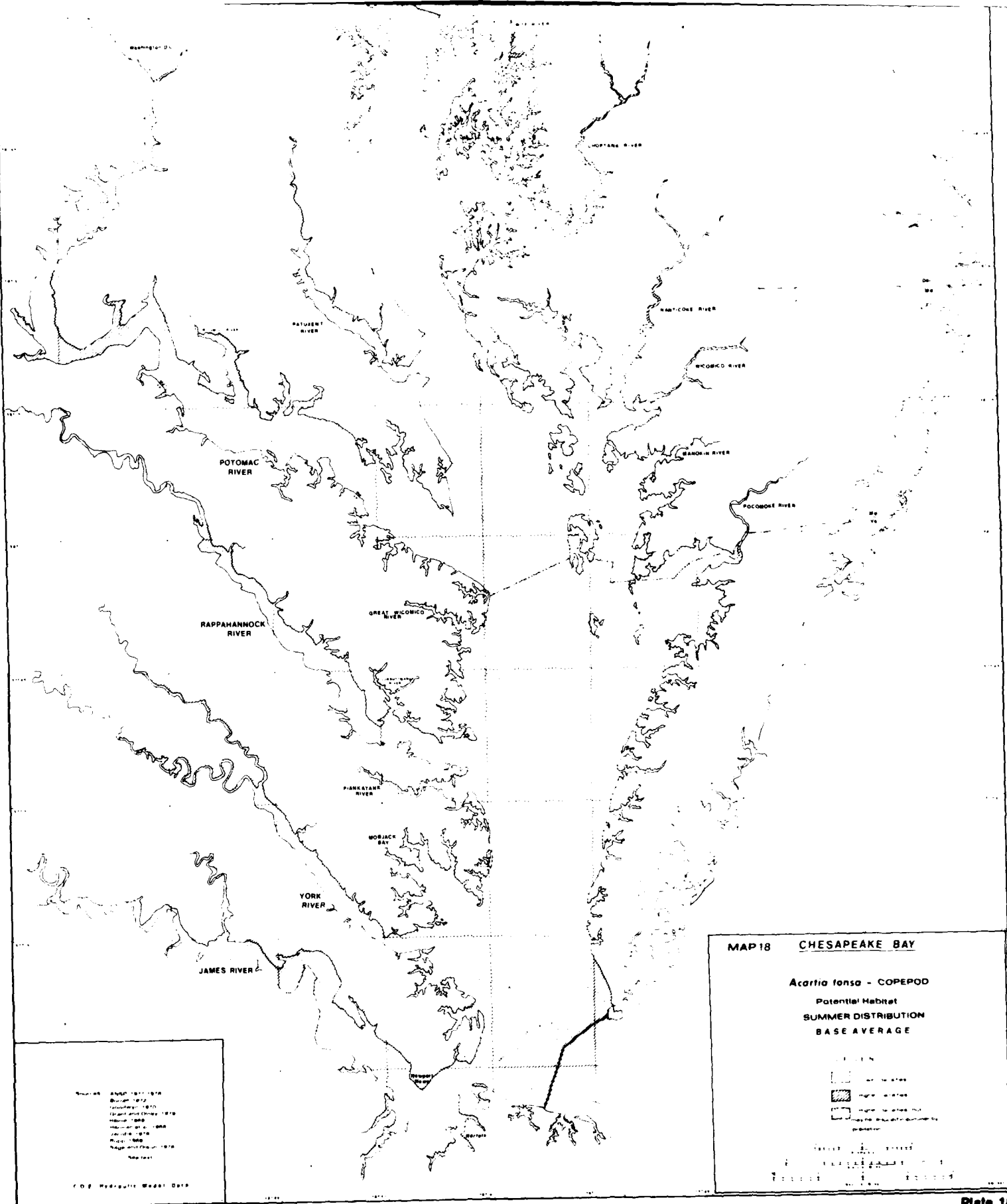
SHENANDOAH RIVER

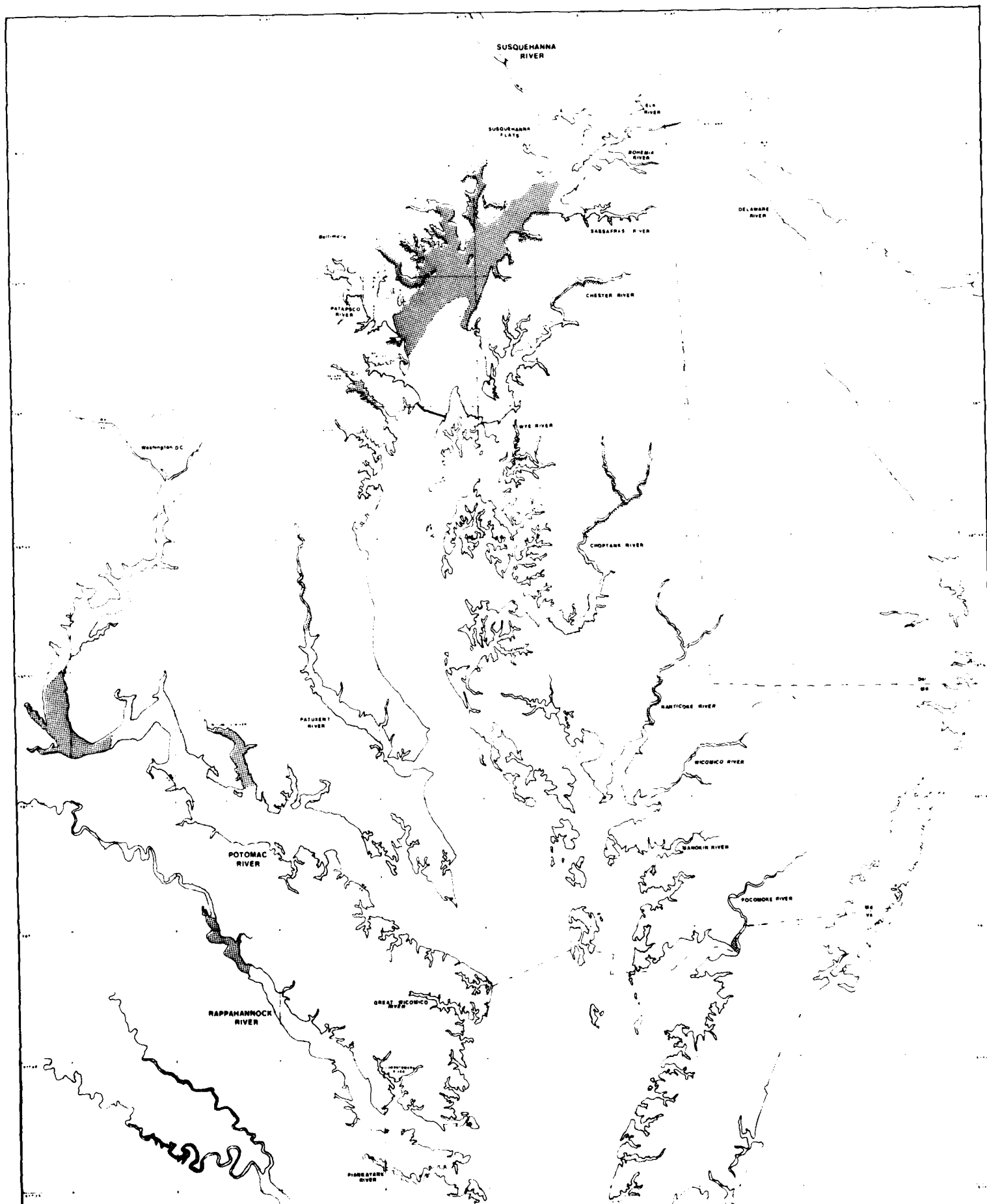
PIKE RIVER

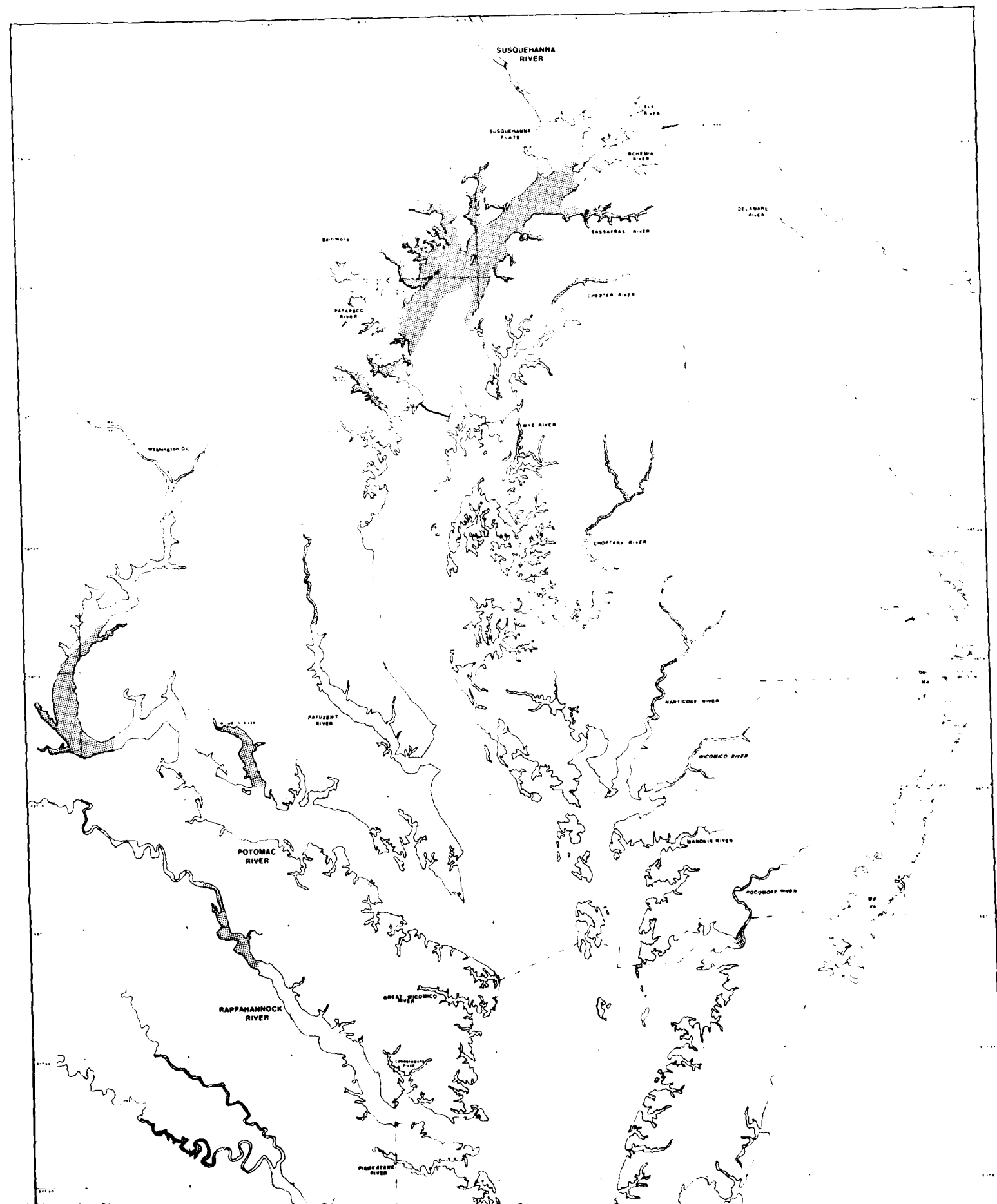


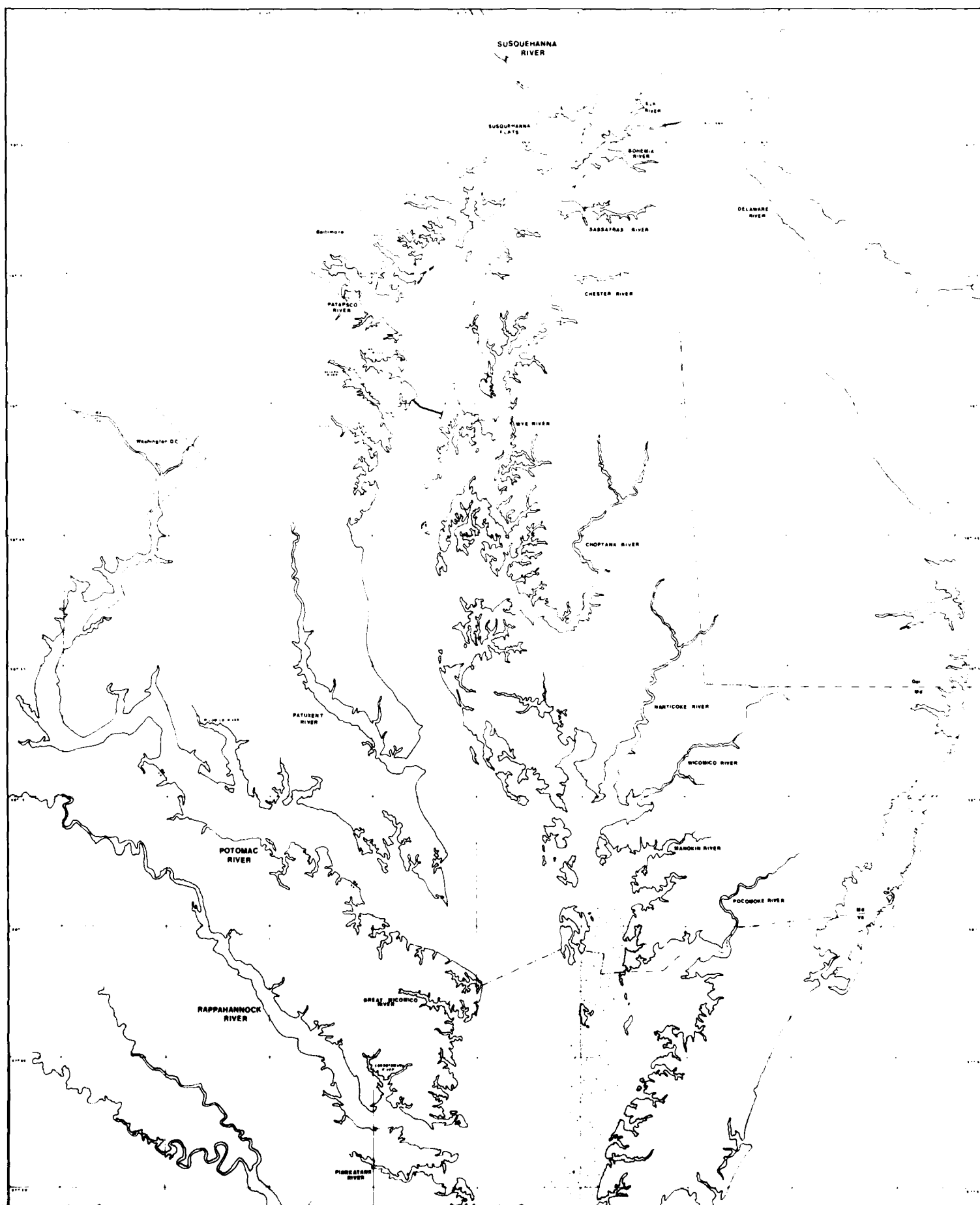


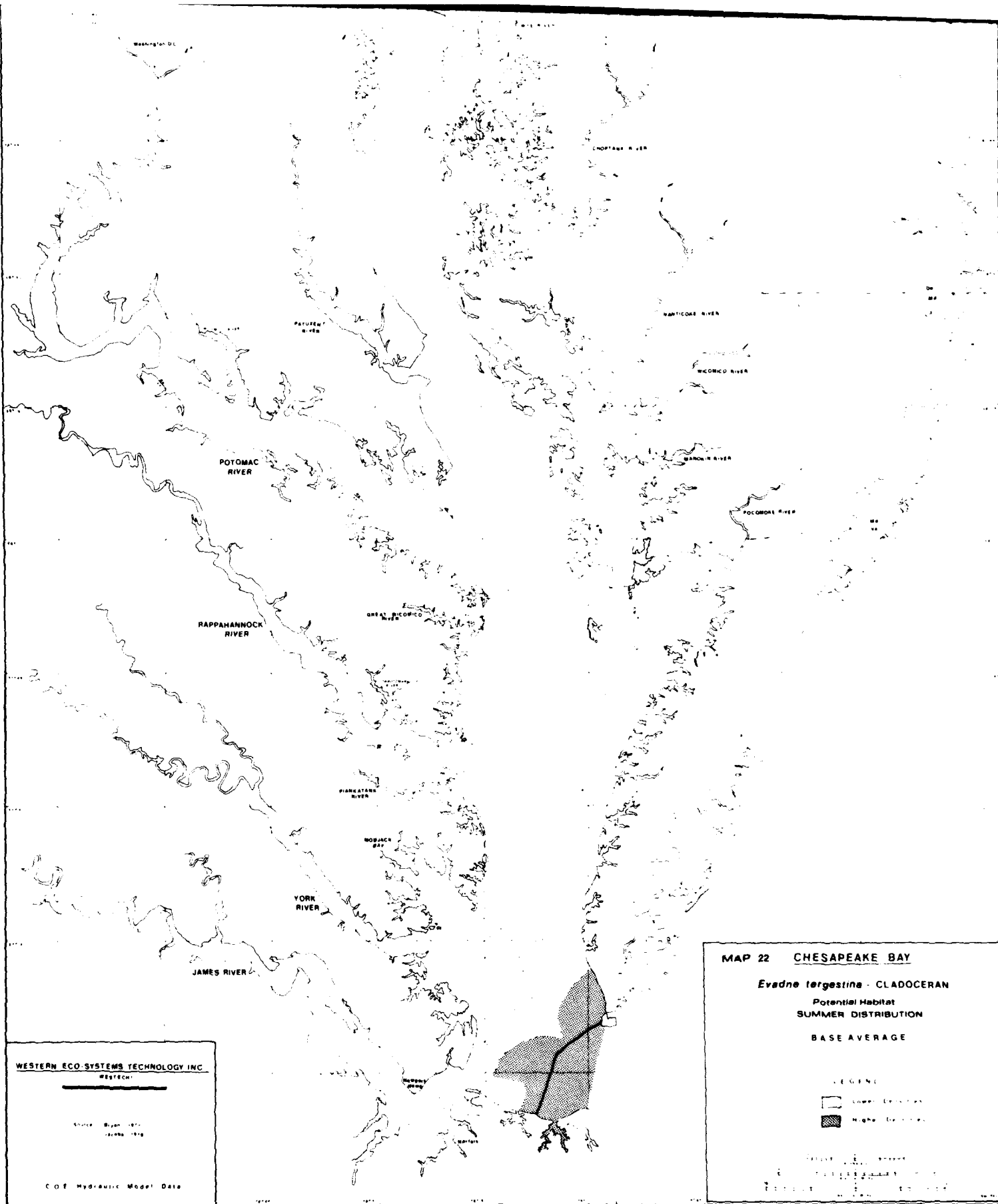


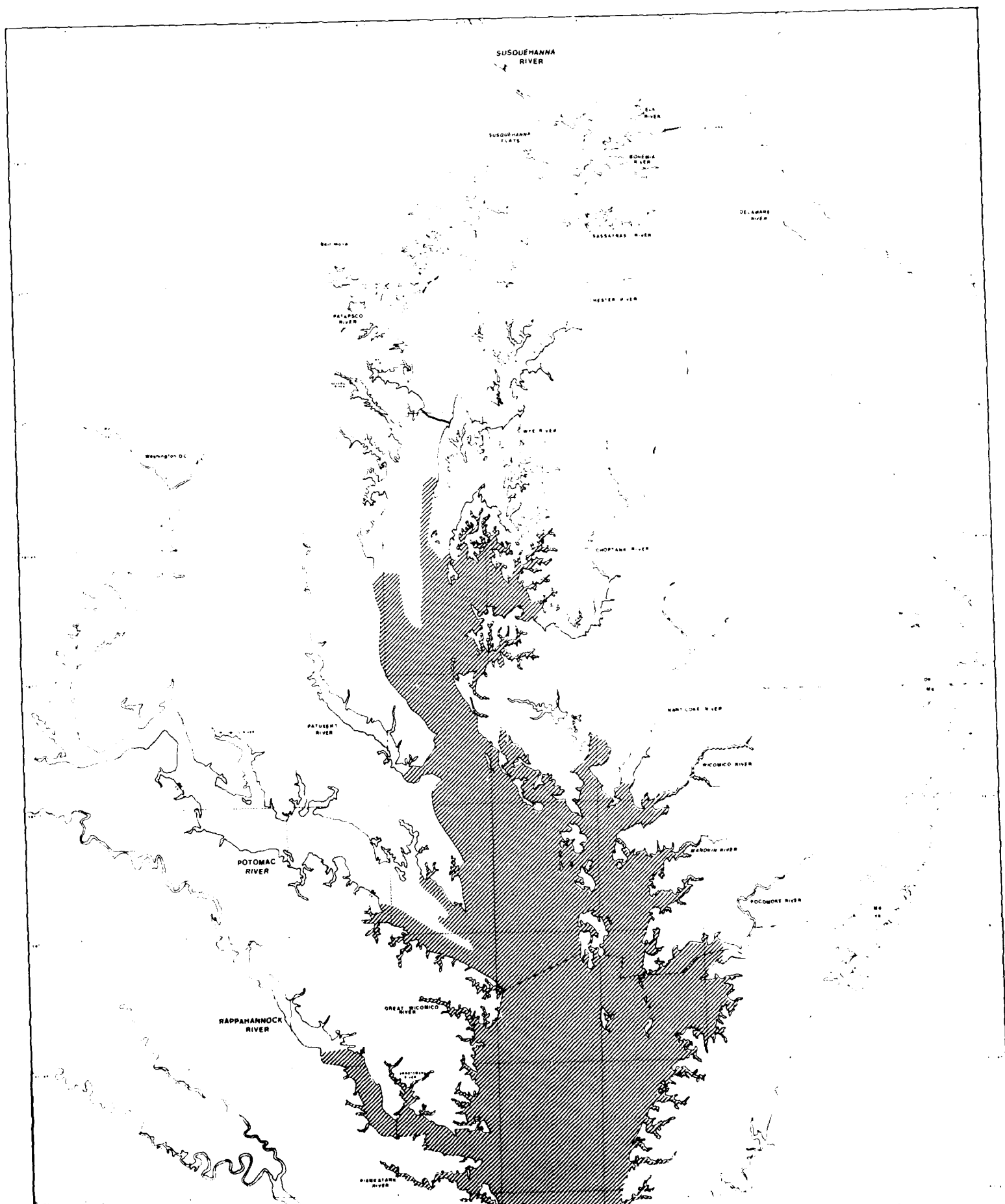


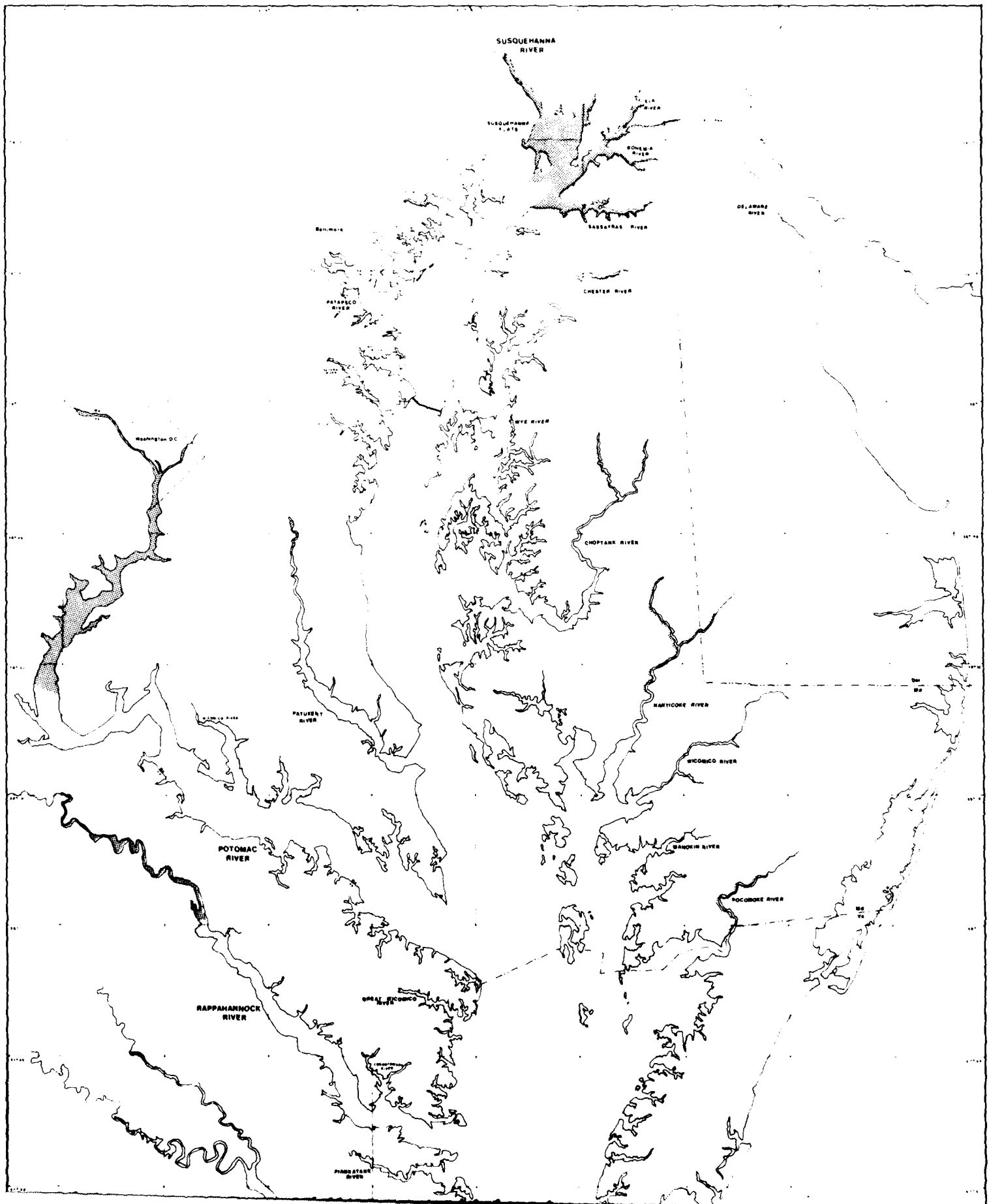


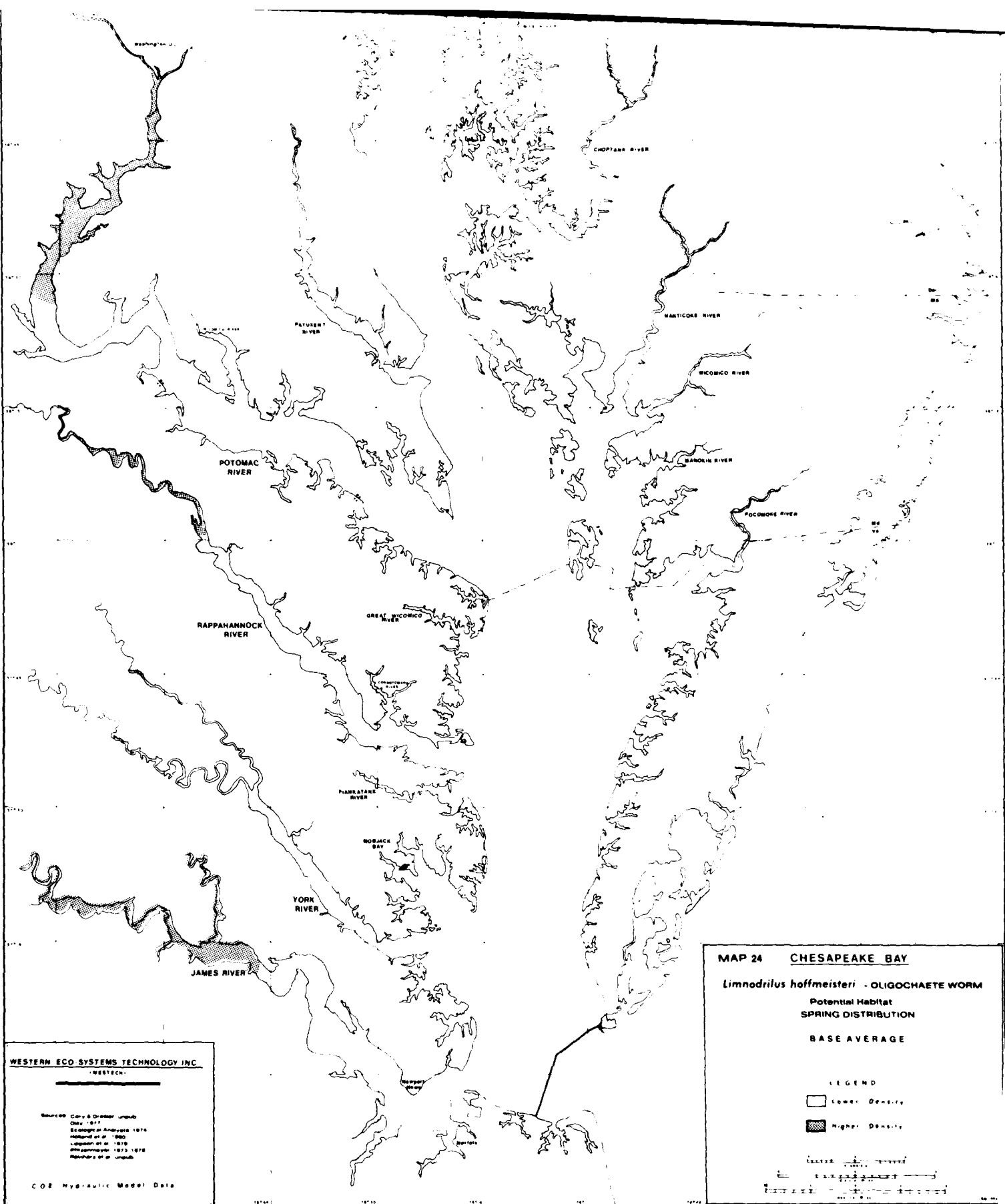


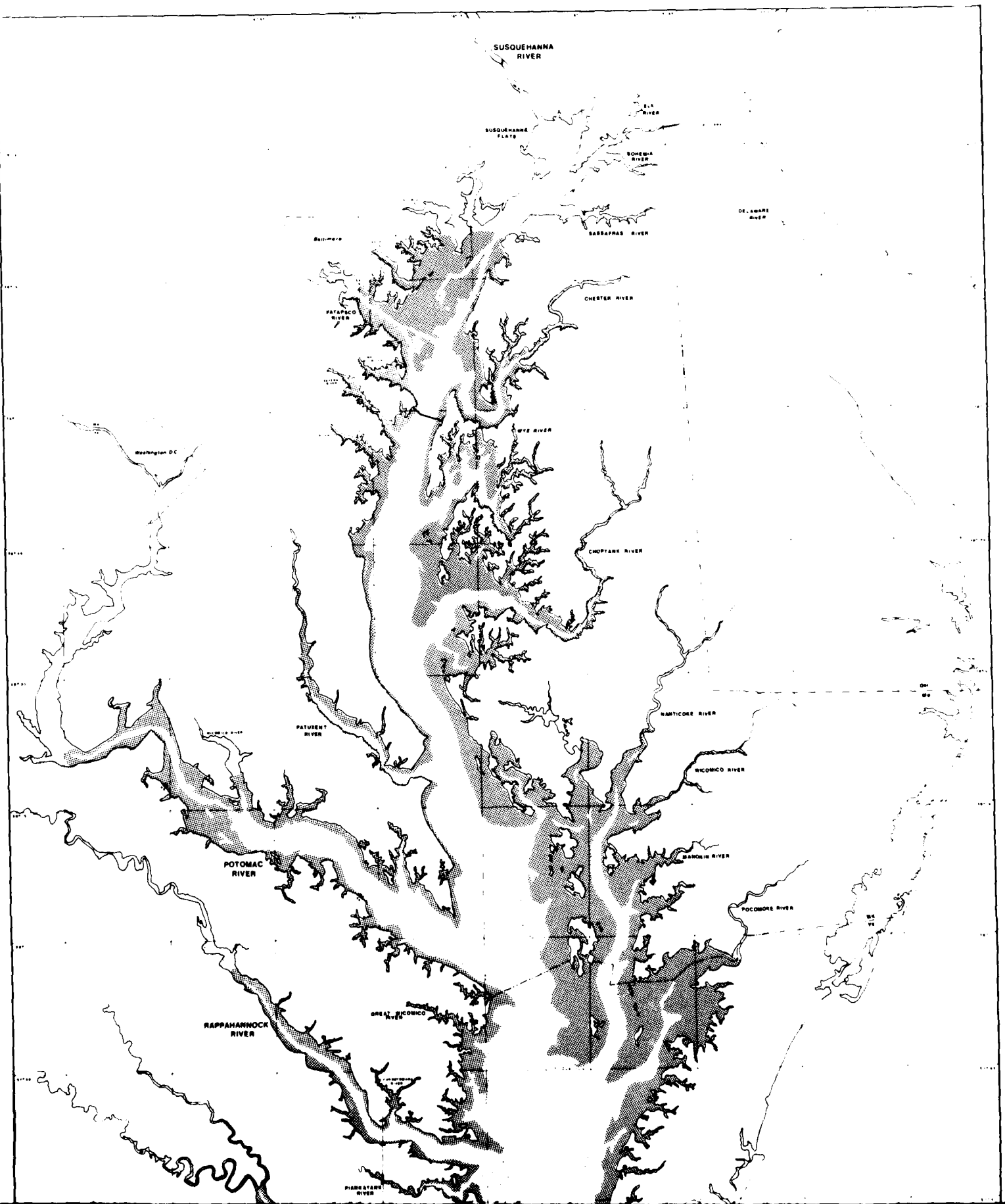












SUSQUEHANNA
RIVER

SUSQUEHANNA
PLATE

ELK
RIVER

BOHEMIA
RIVER

DELAWARE
RIVER

SASSARAS RIVER

CHESTER RIVER

PATAPSCO
RIVER

WYE RIVER

CHOPTANK RIVER

WASHINGTON DC

PATUXENT
RIVER

ANTICOSTA RIVER

WICOMICO RIVER

POTOMAC
RIVER

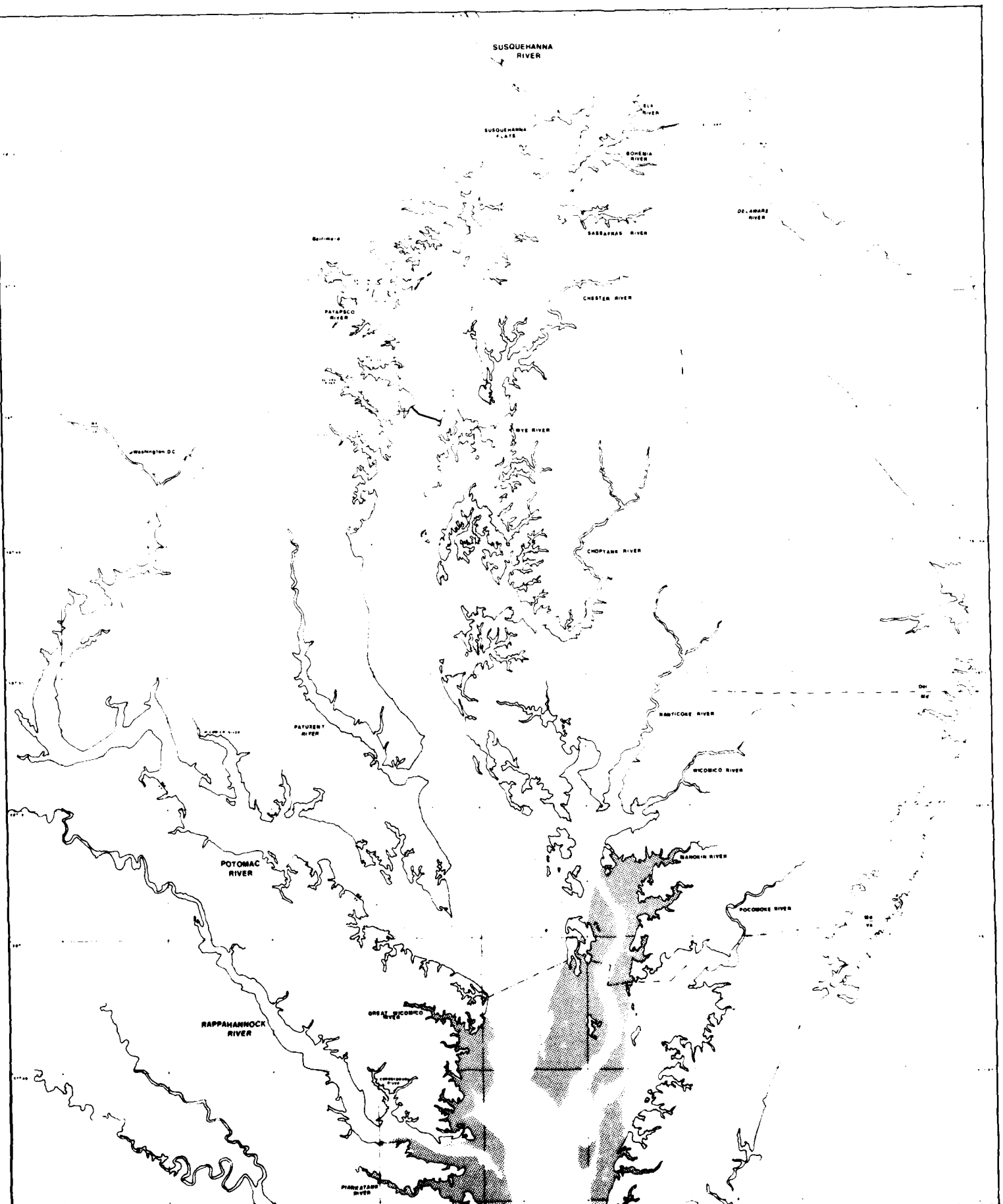
SANOHIA RIVER

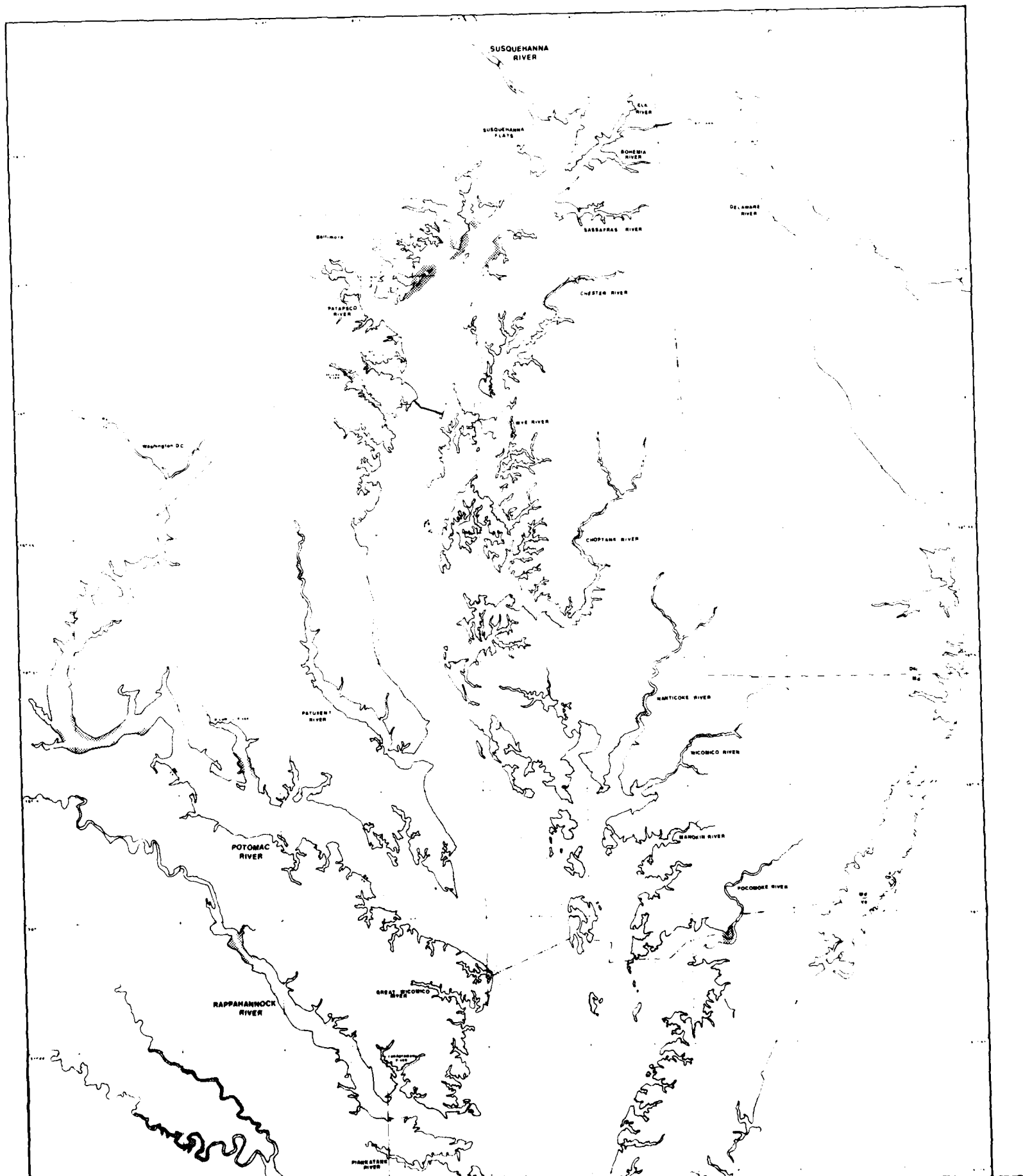
POCONO RIVER

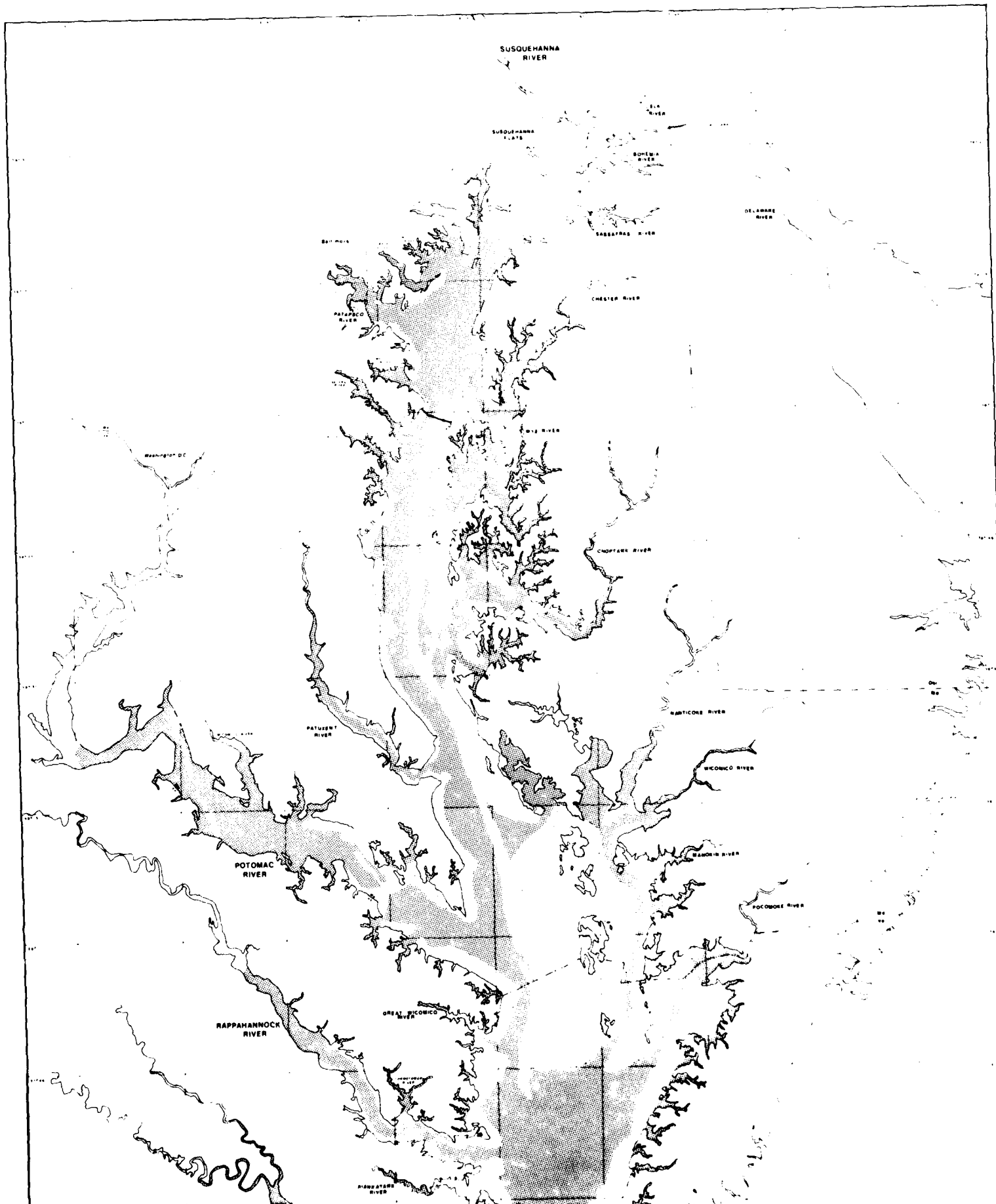
RAPPAHANNOCK
RIVER

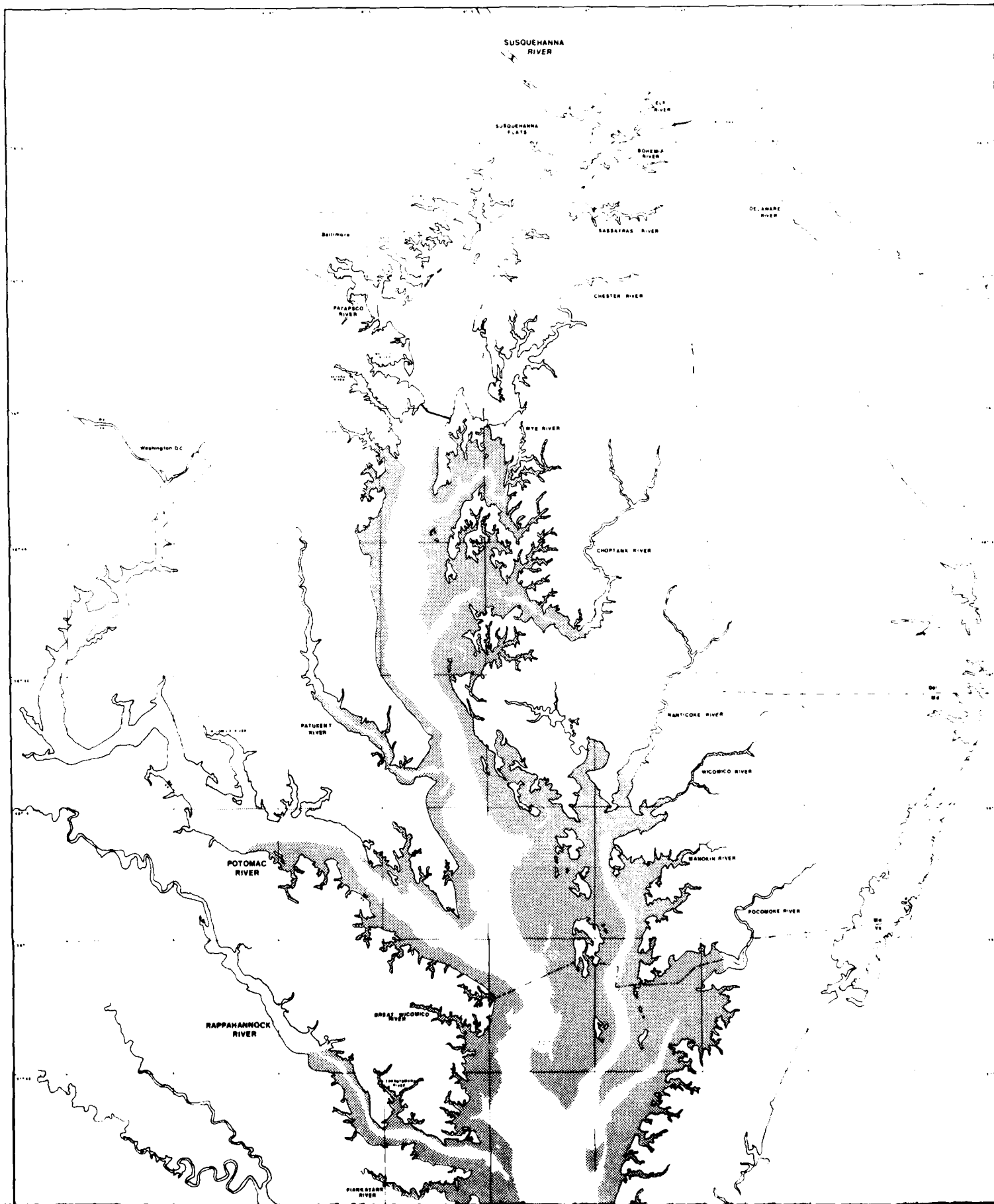
ORAL WICOMICO
RIVER

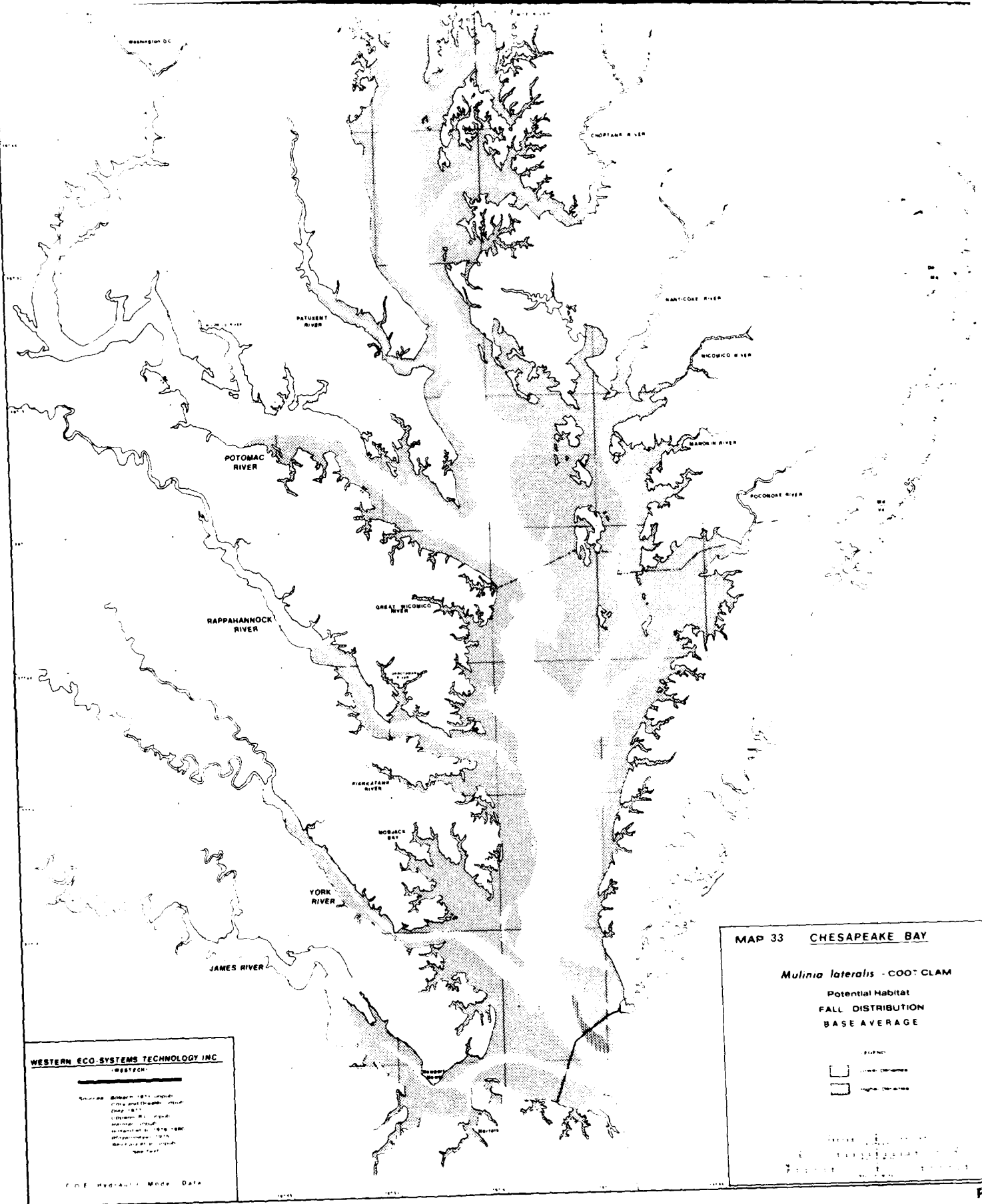
PIKE STAR
RIVER

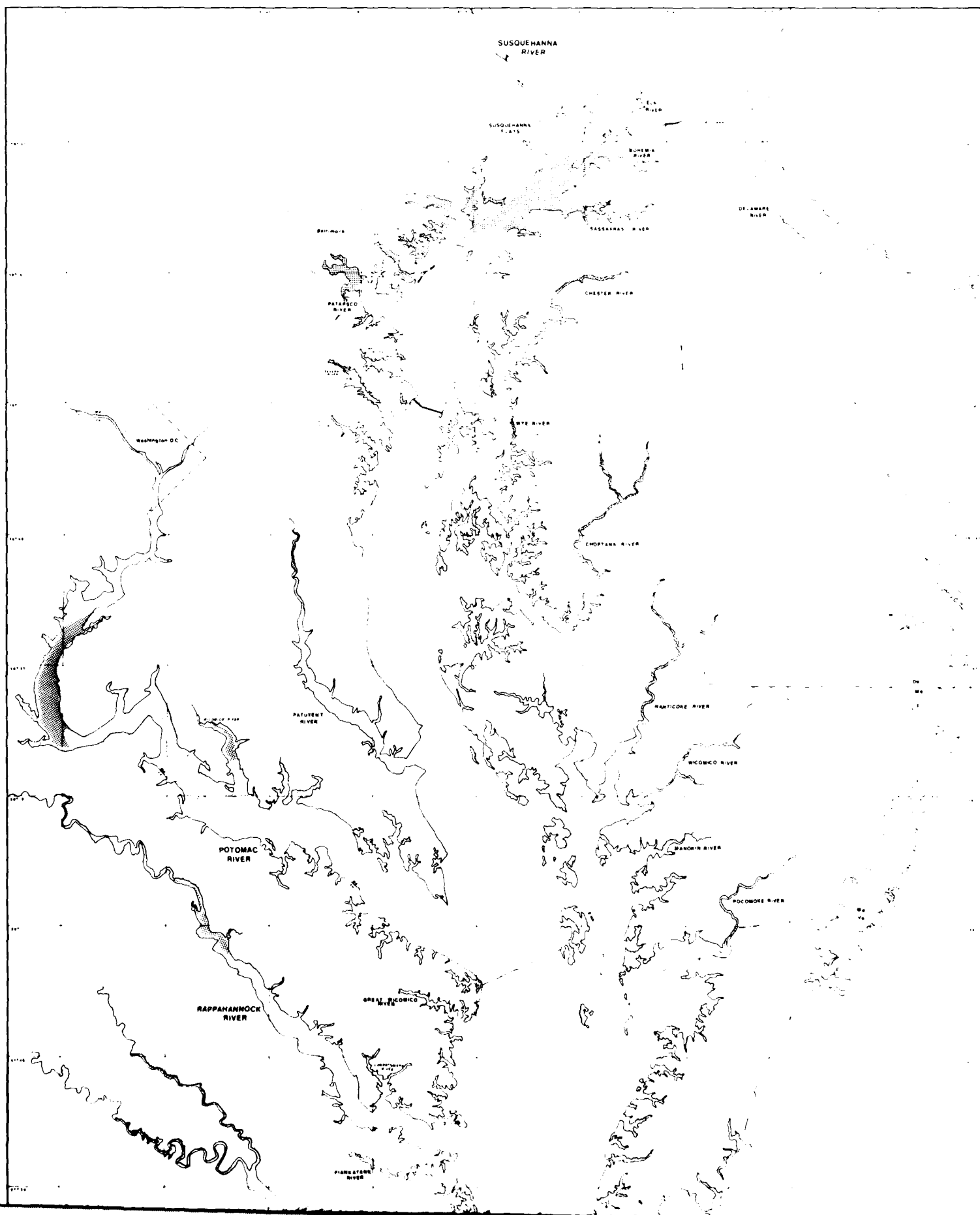


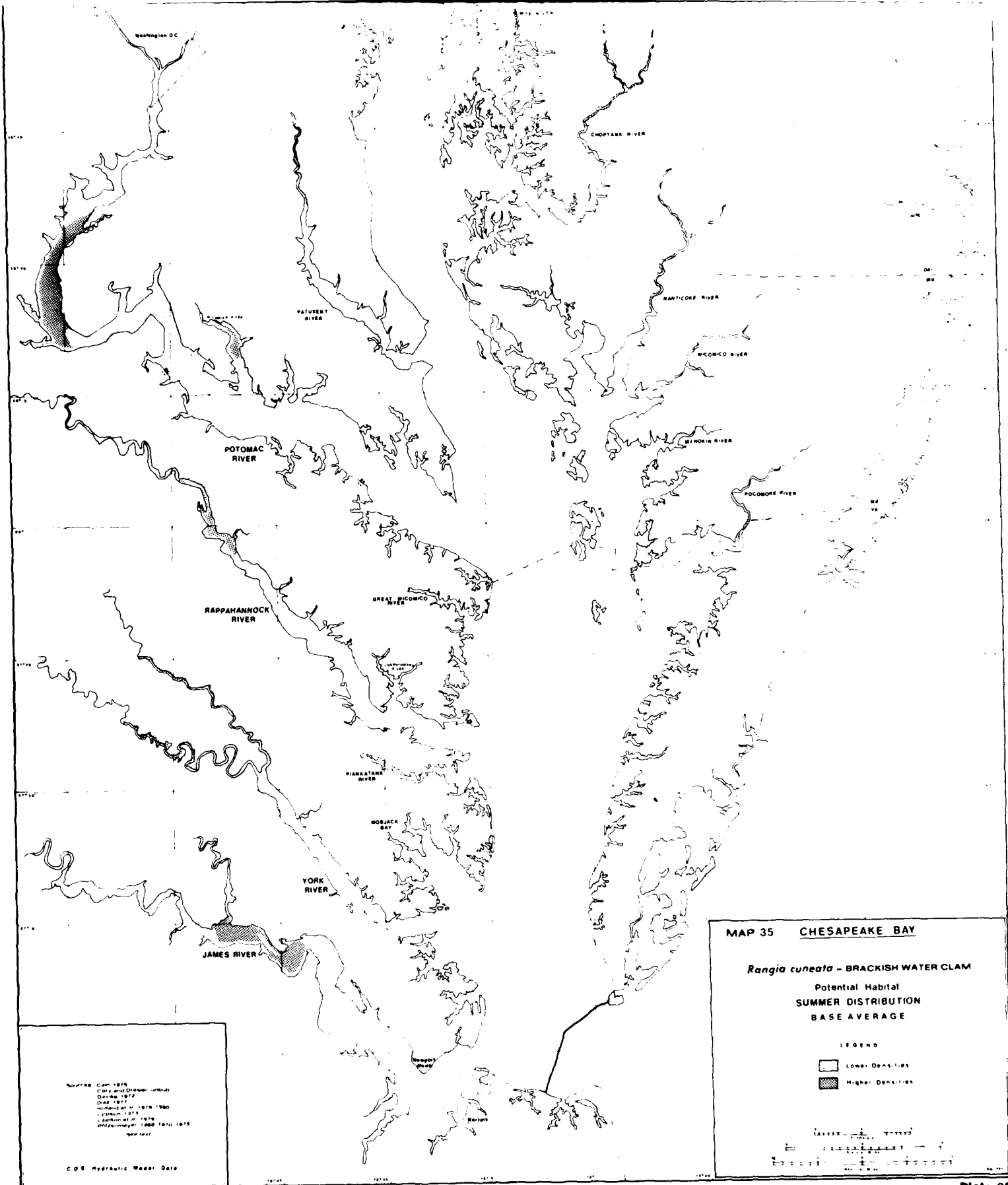


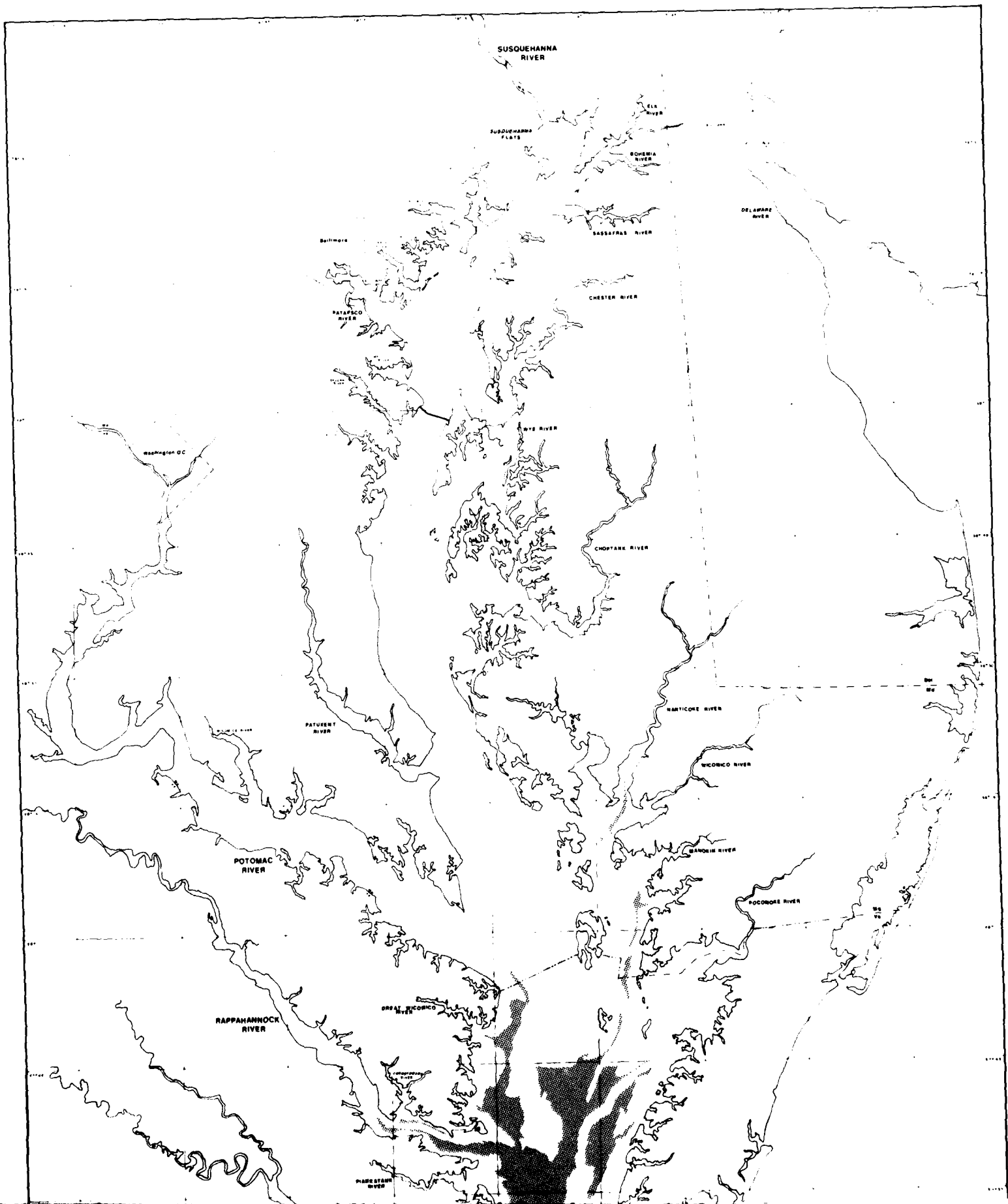


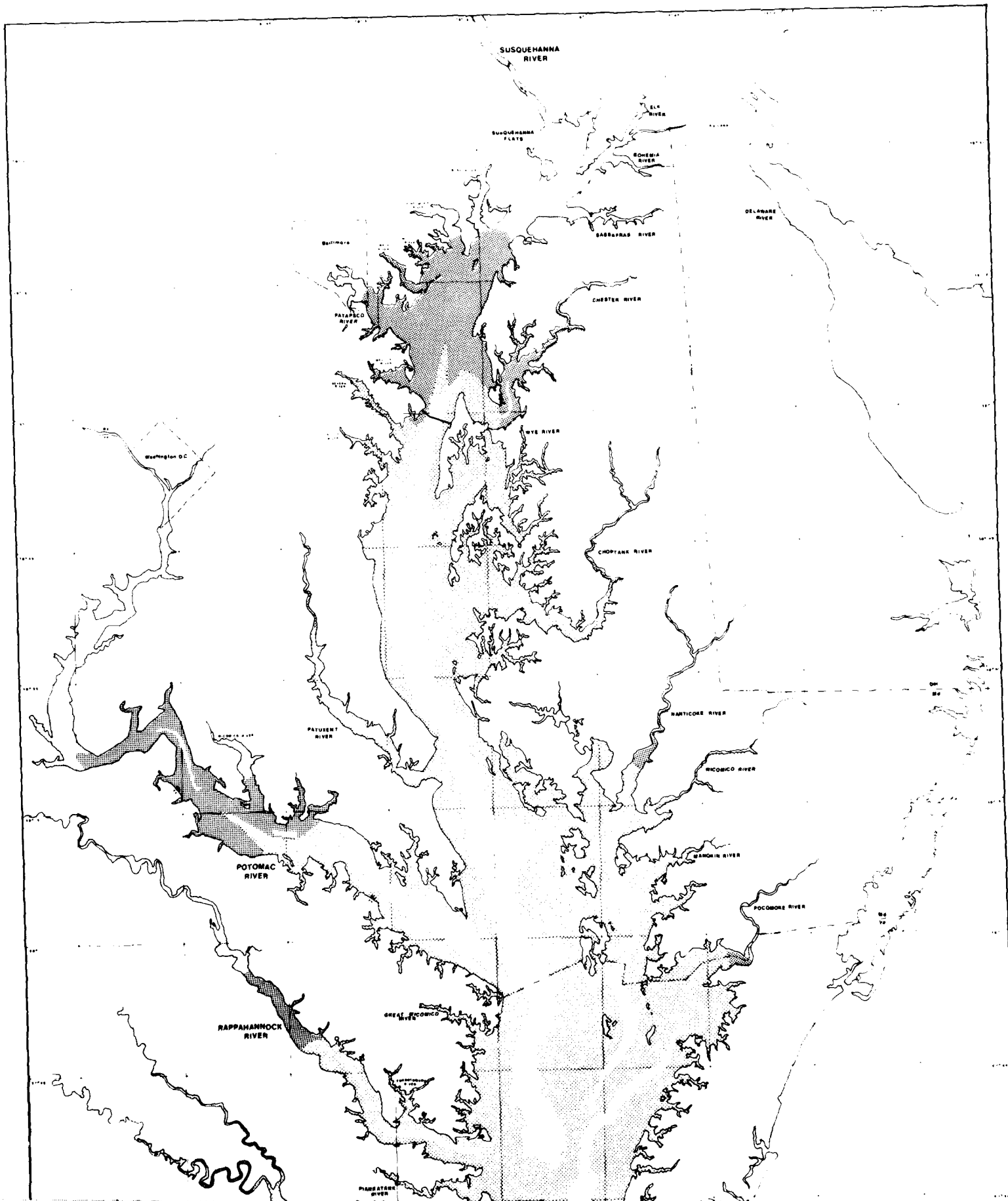


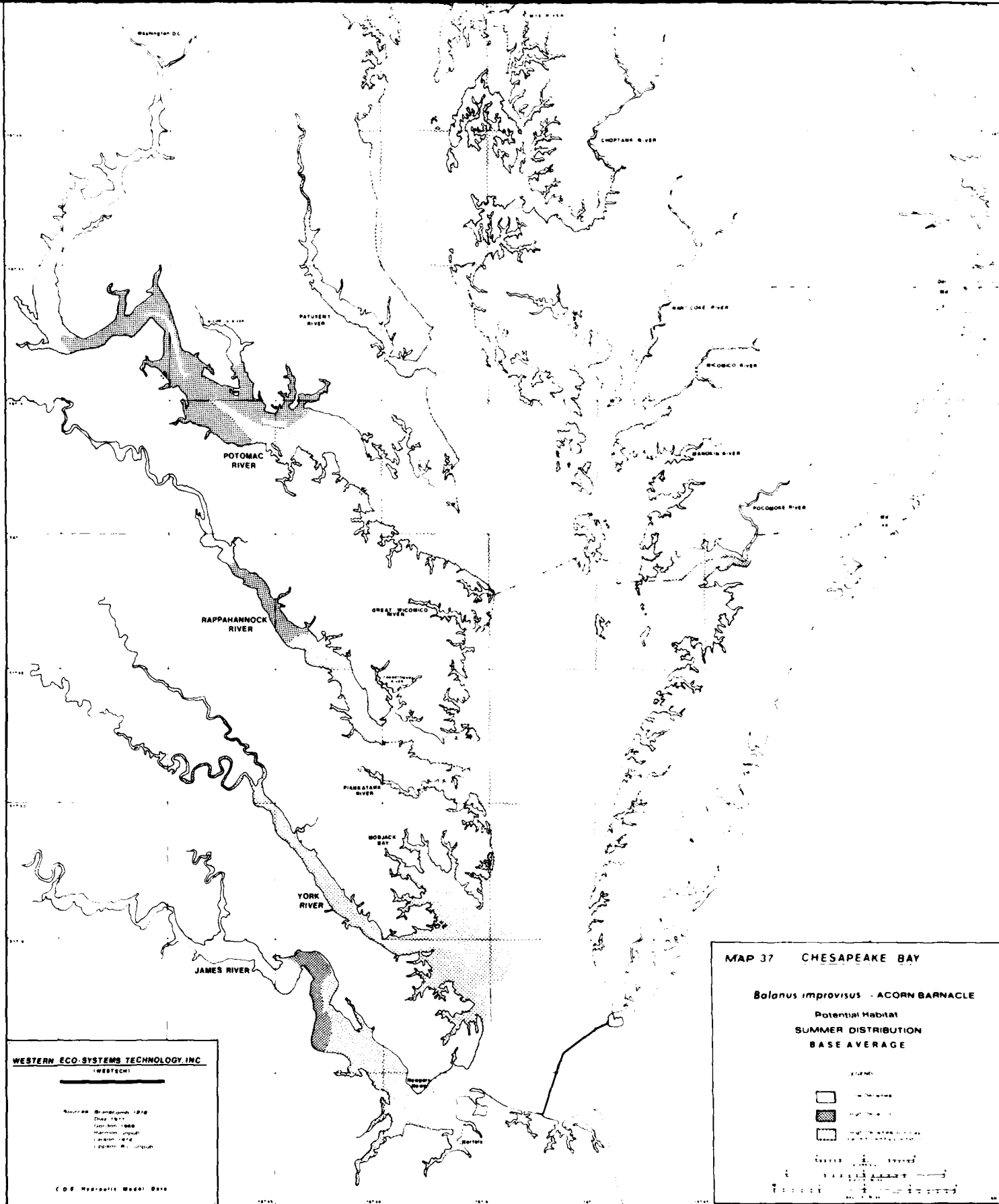


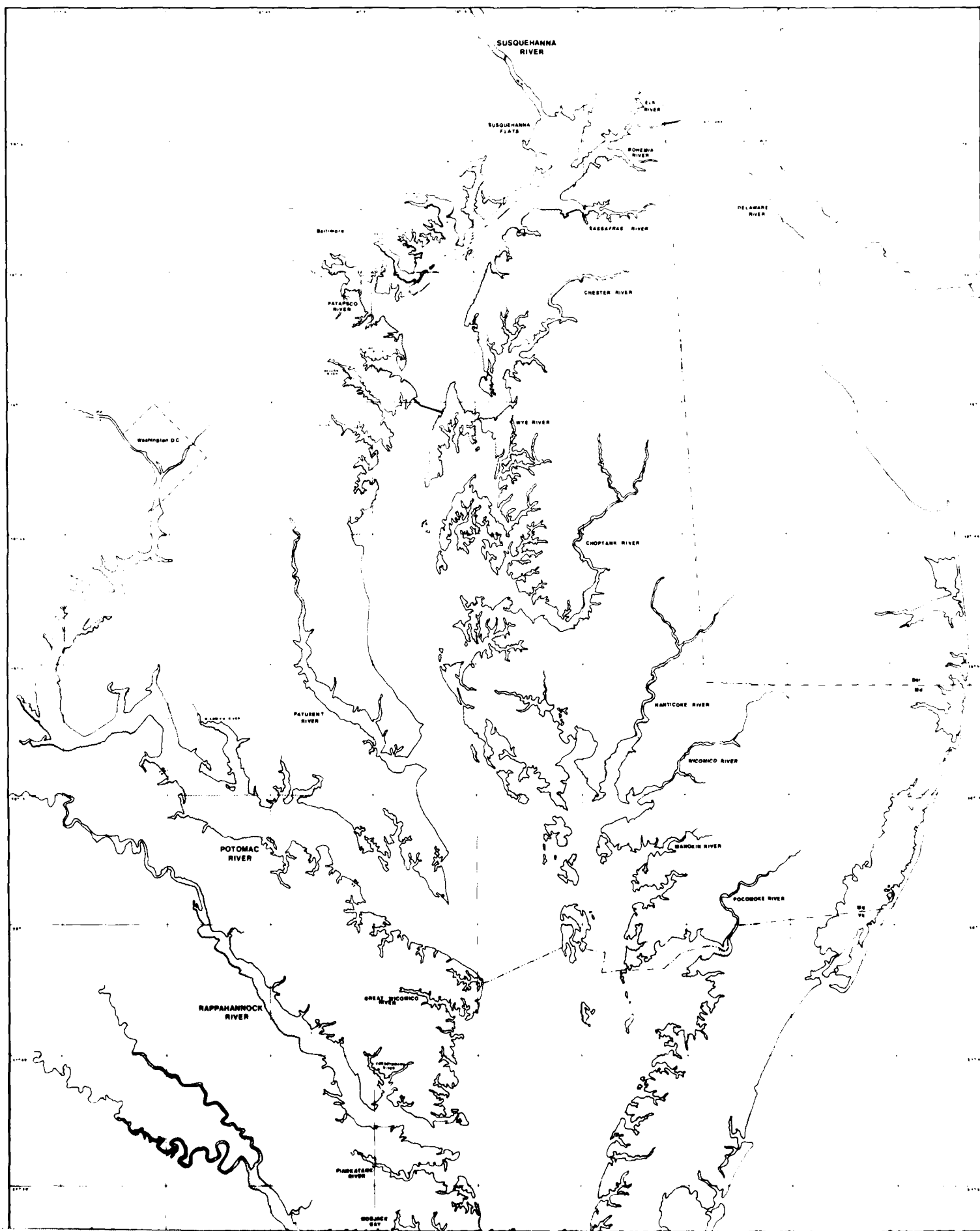


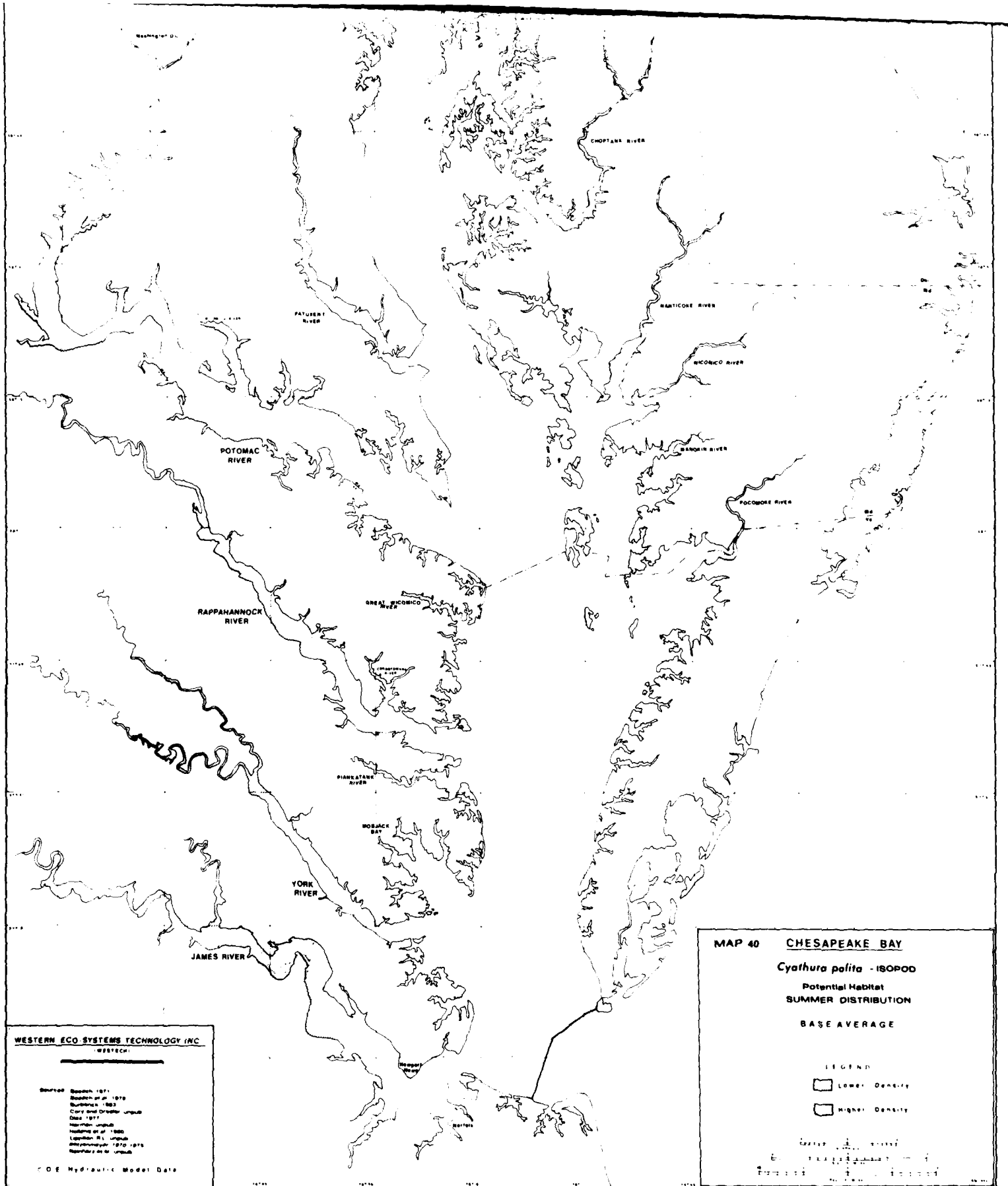


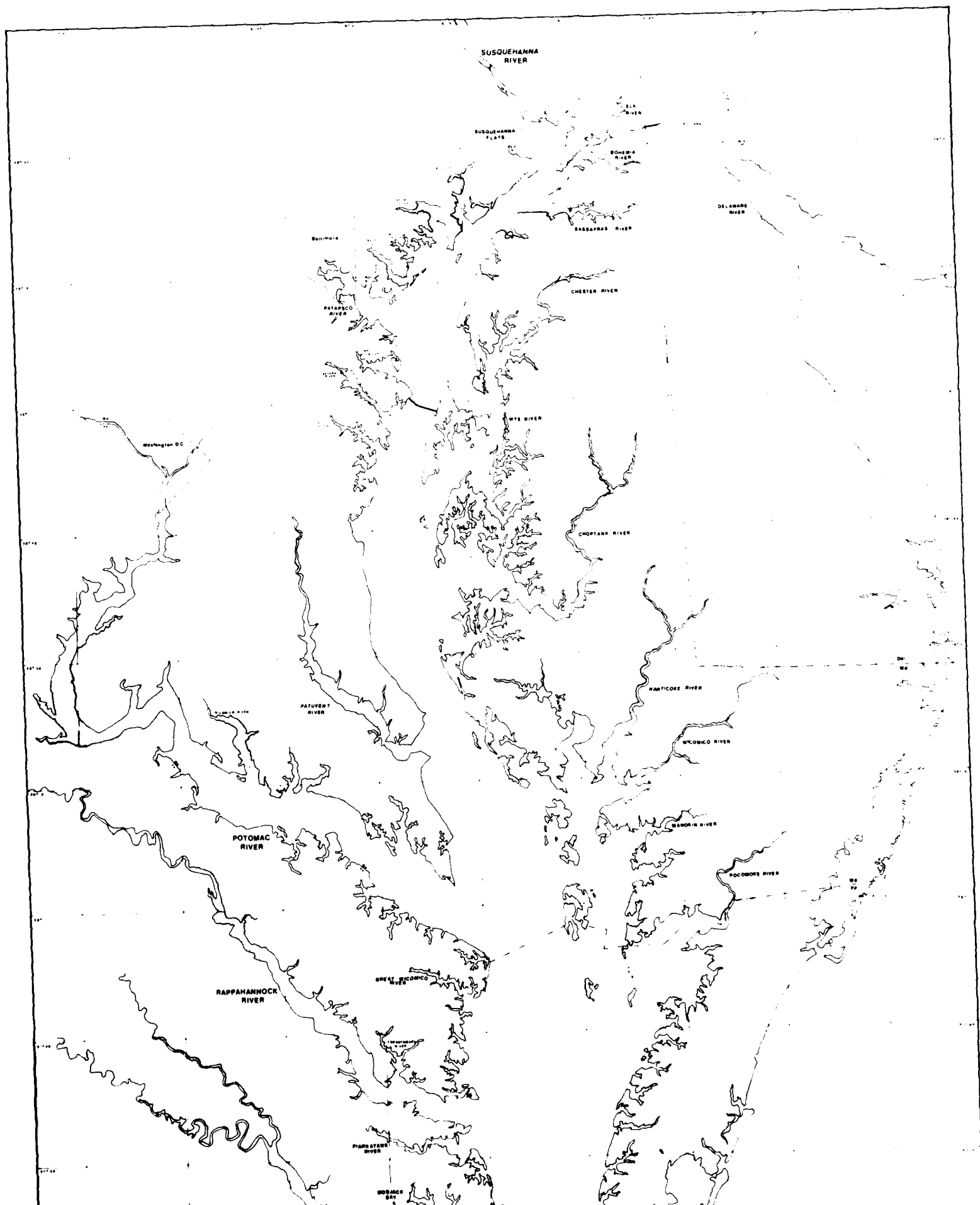


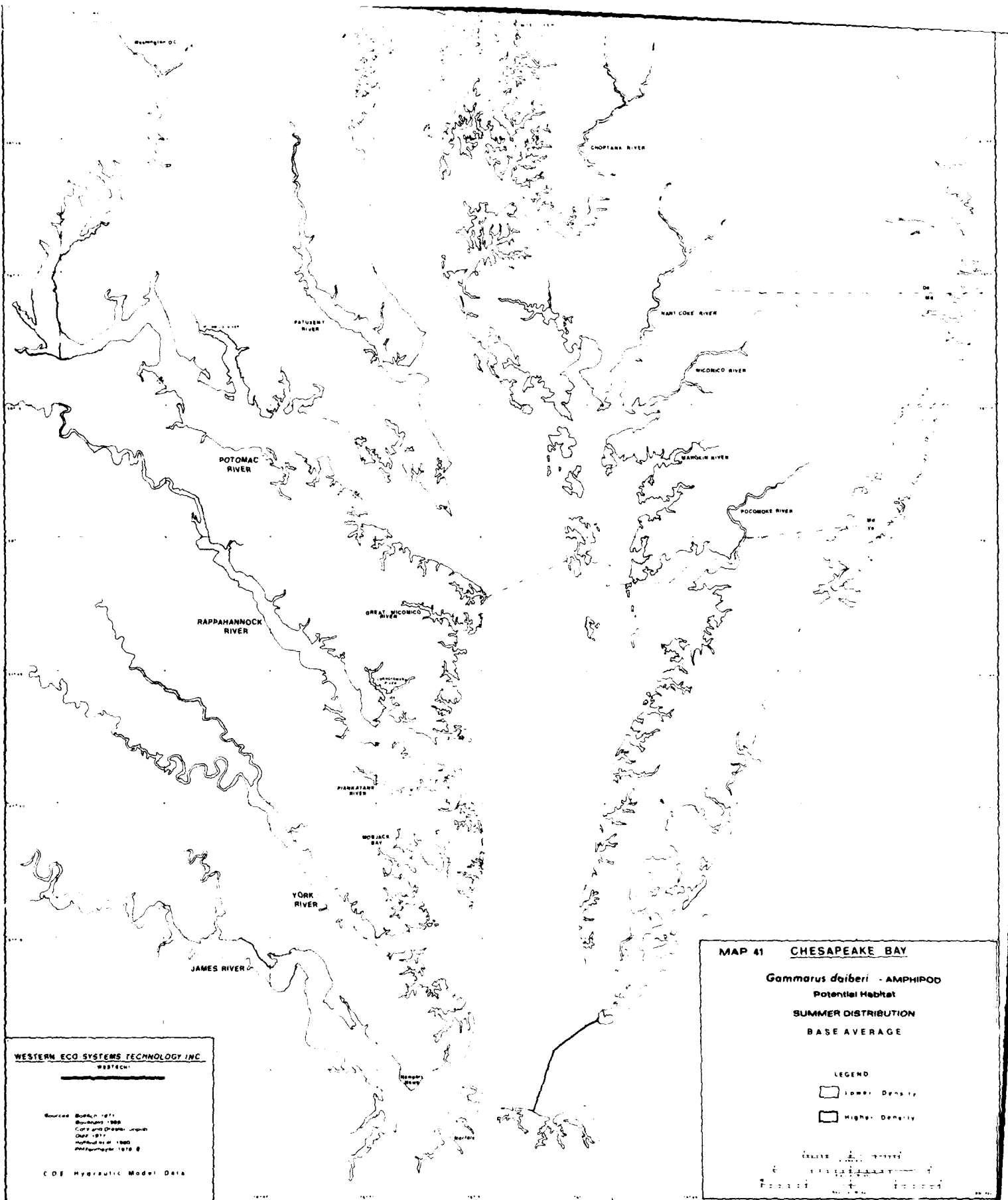




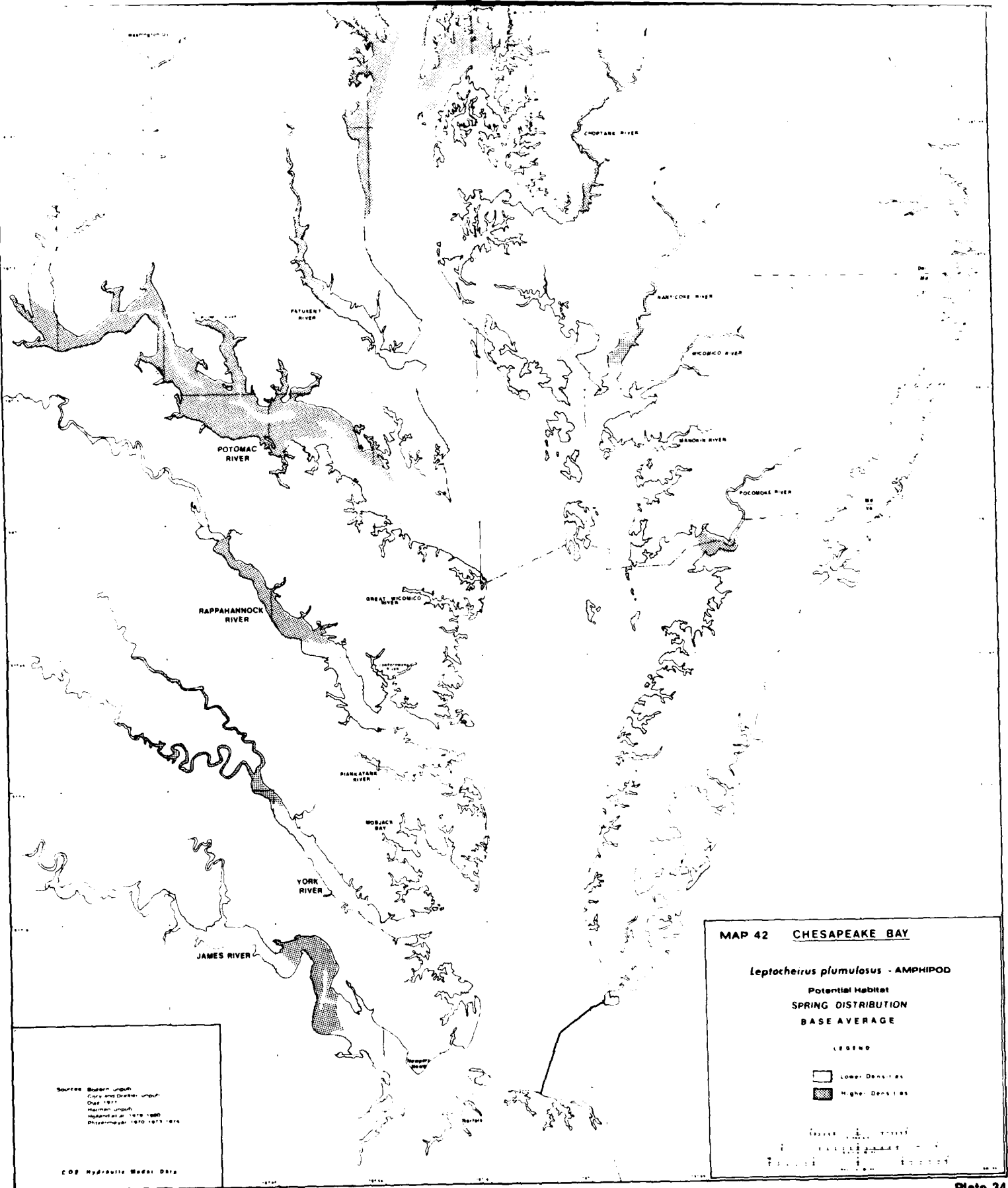


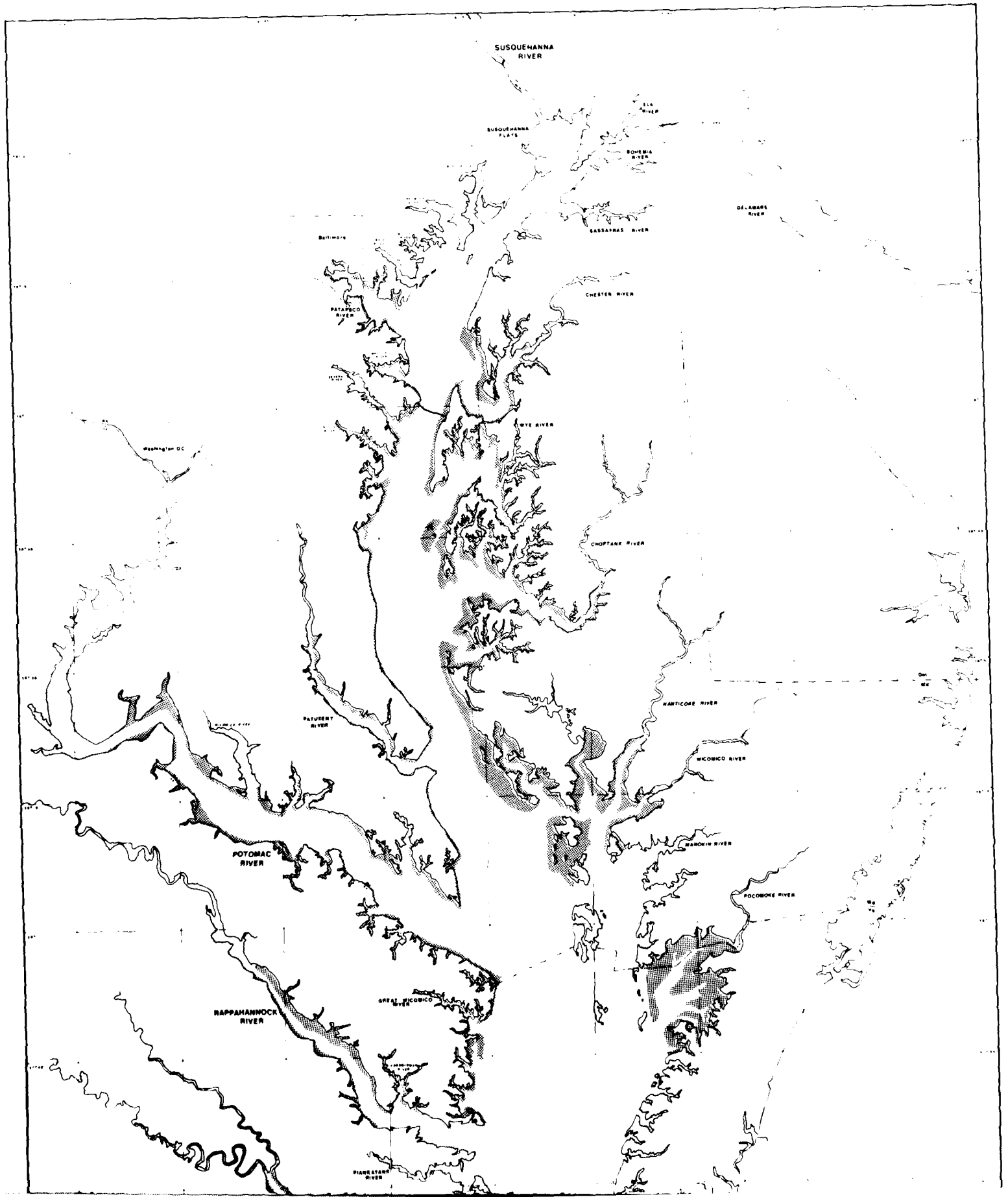


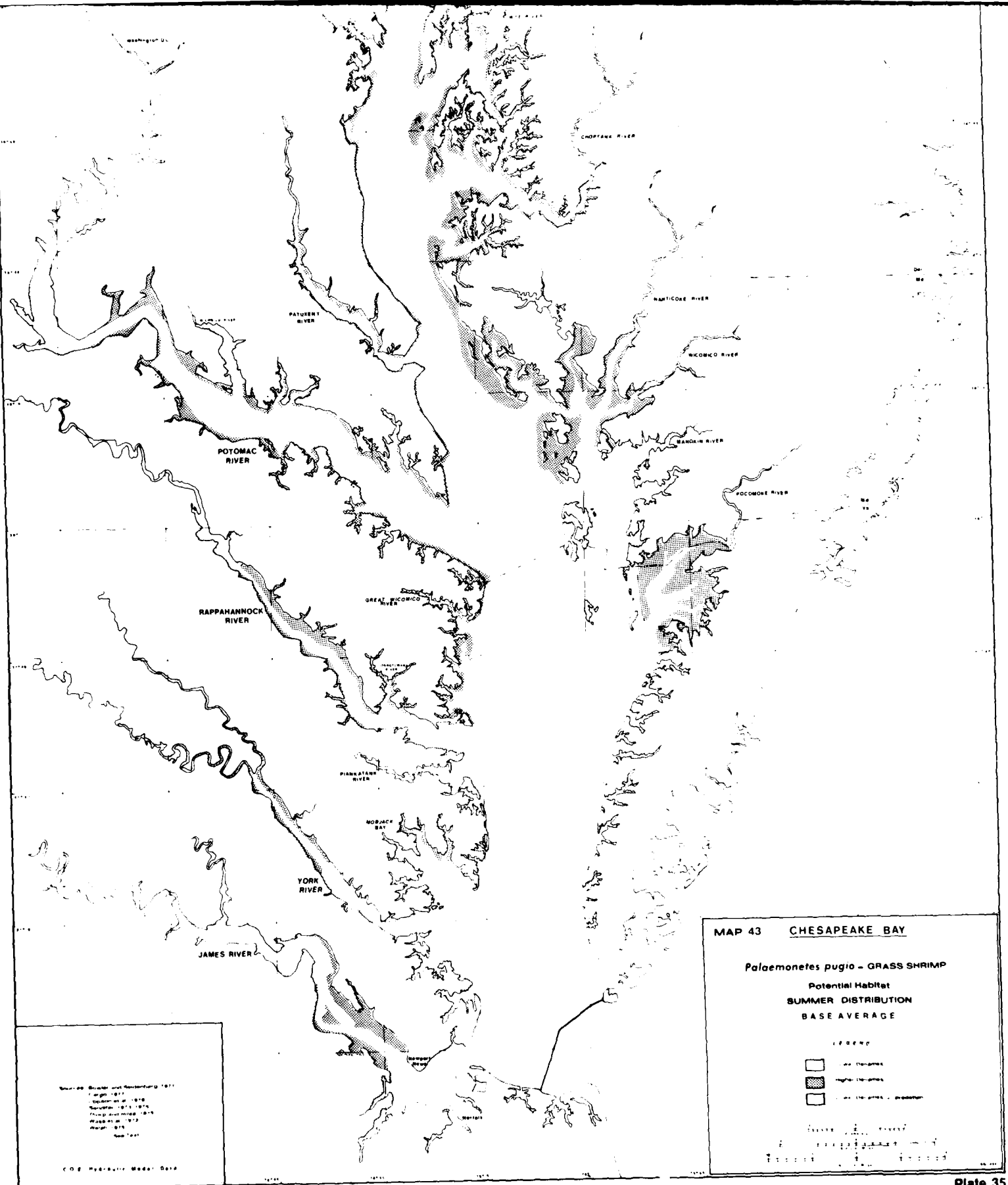


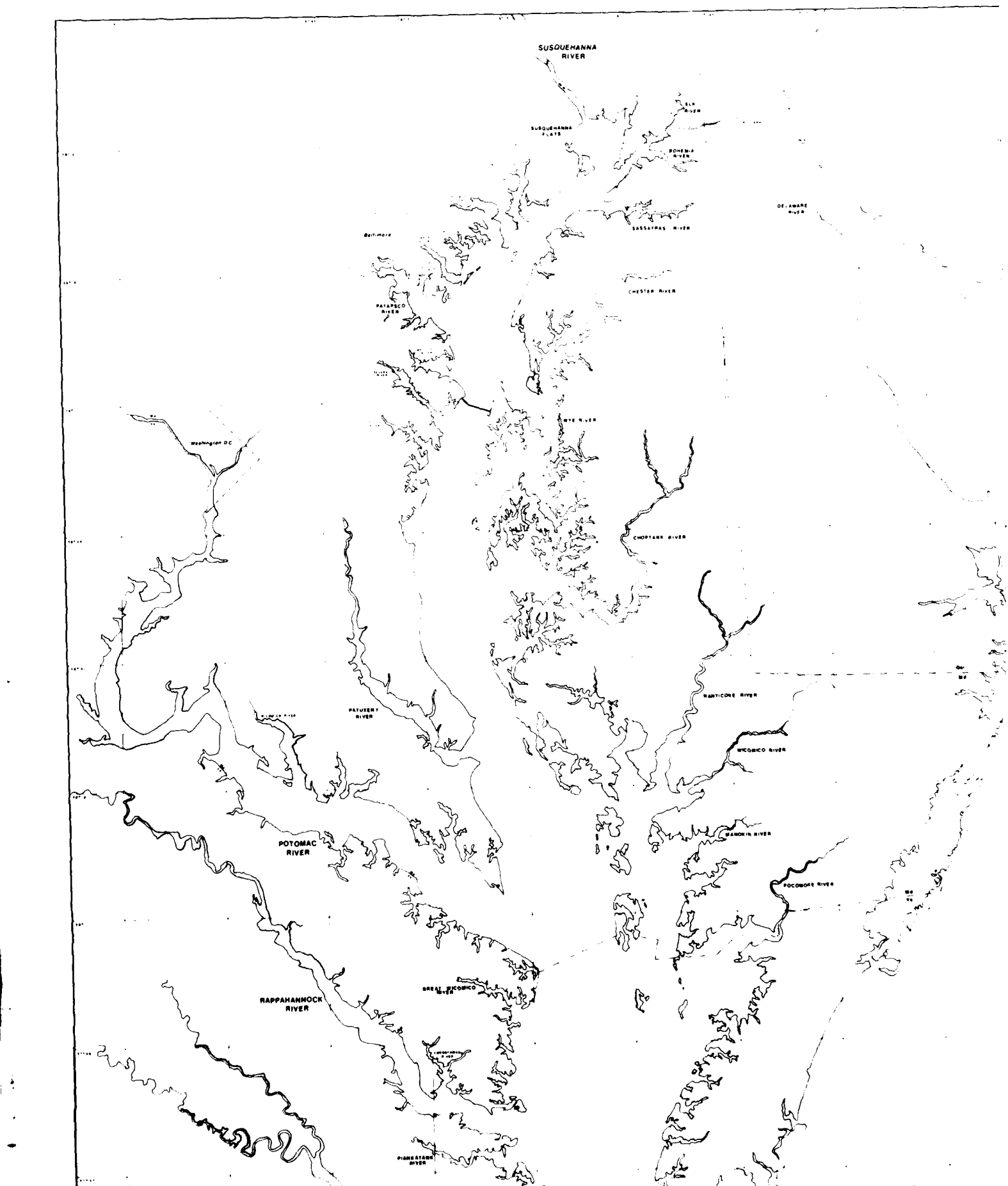


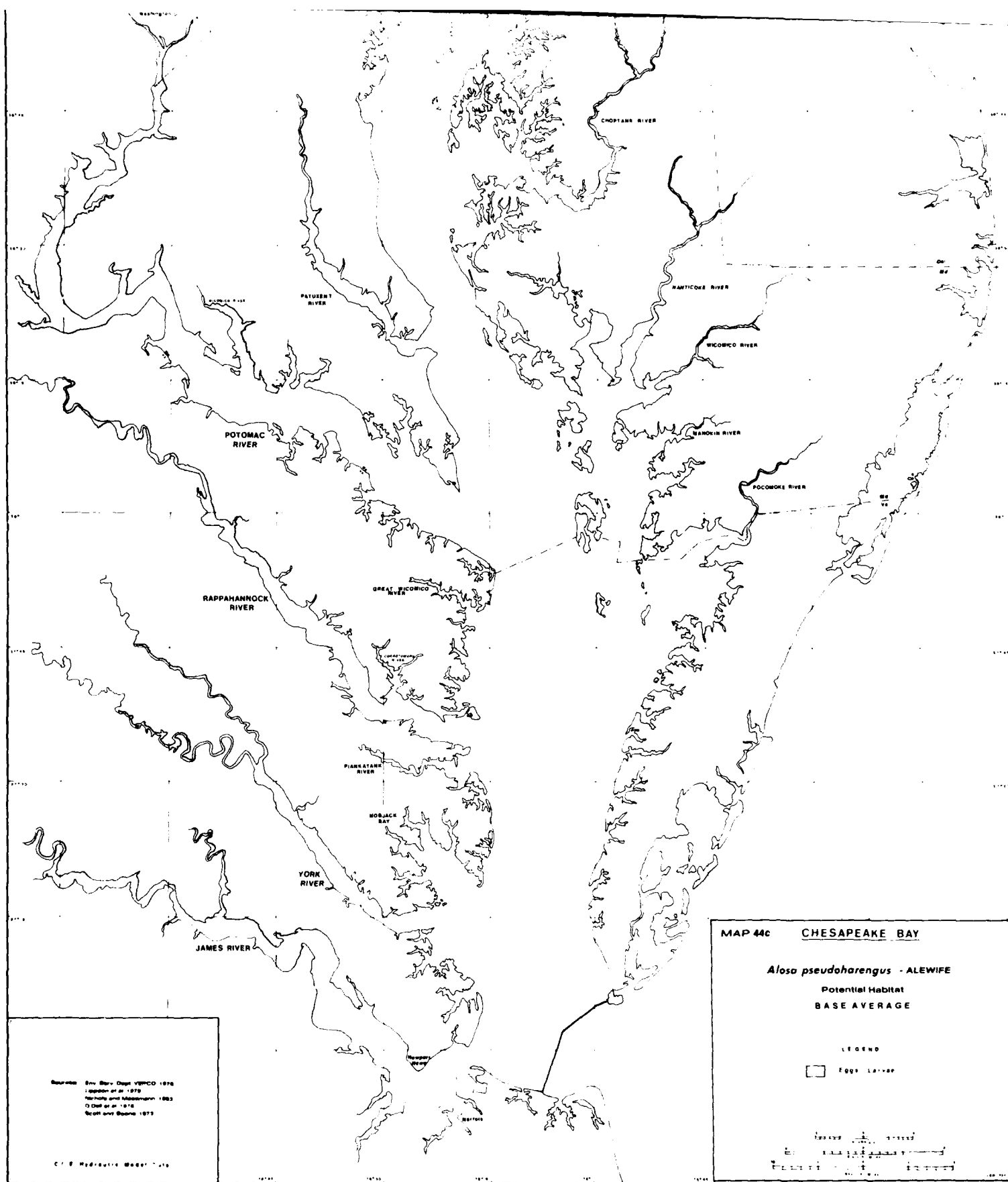


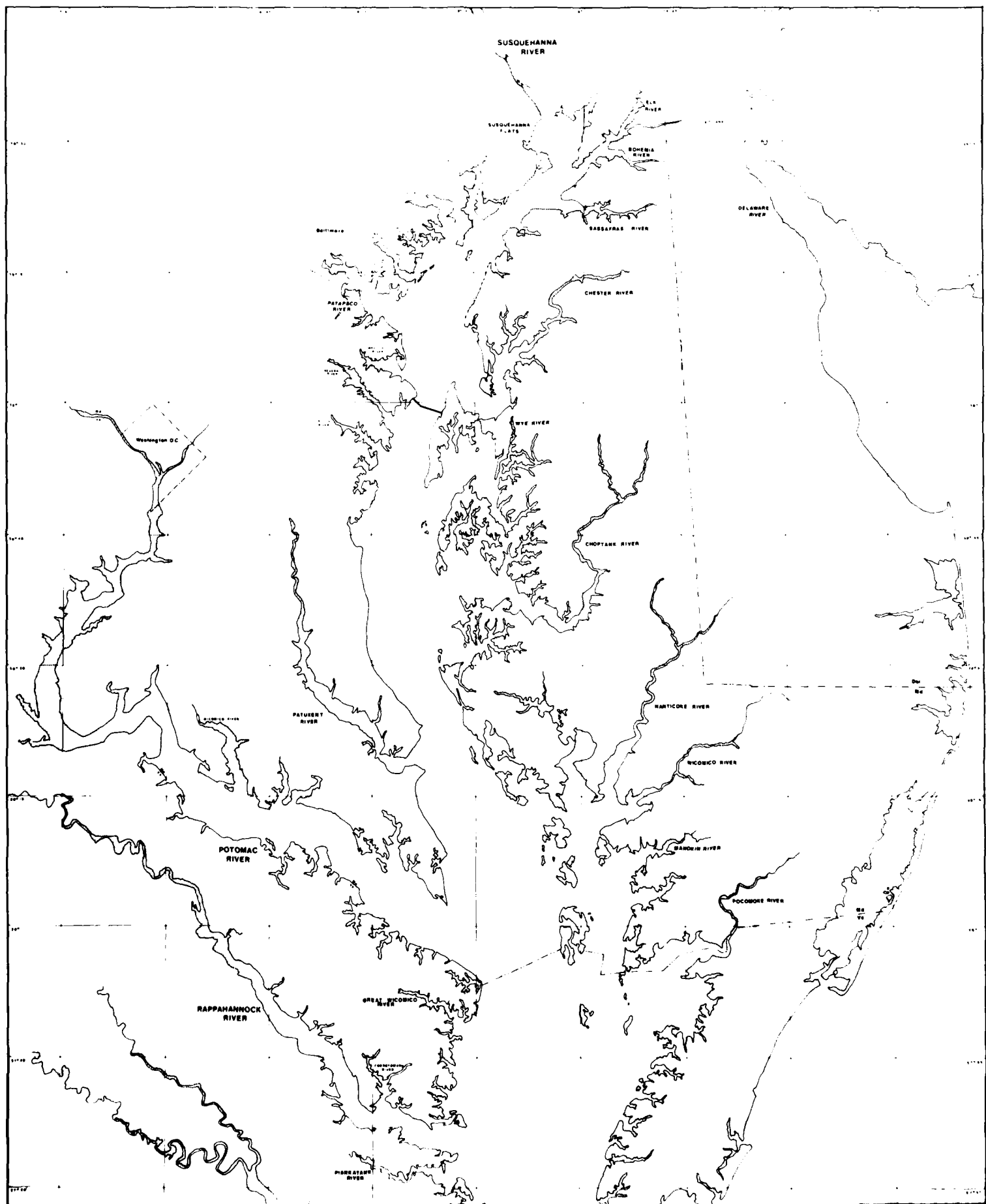


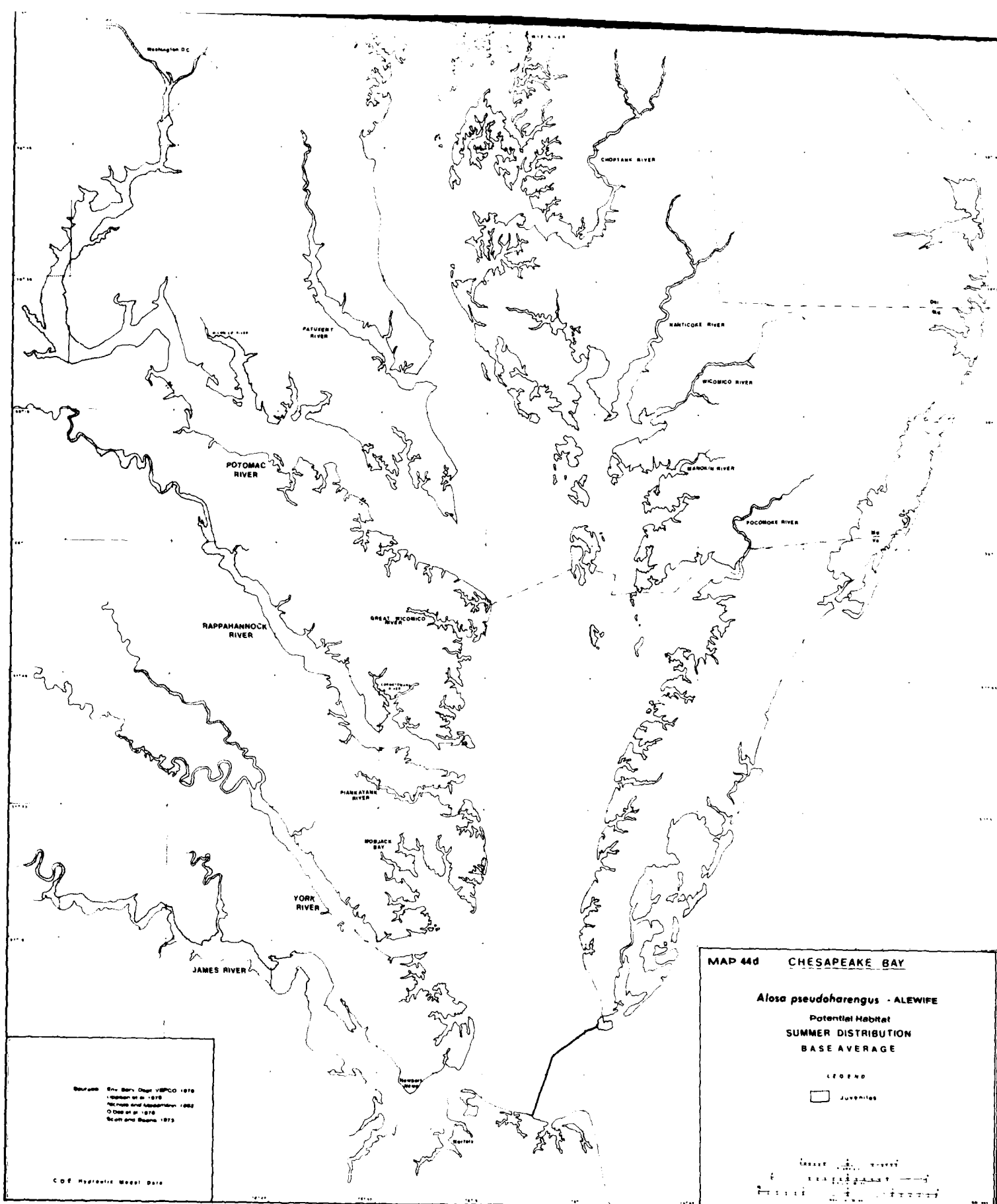


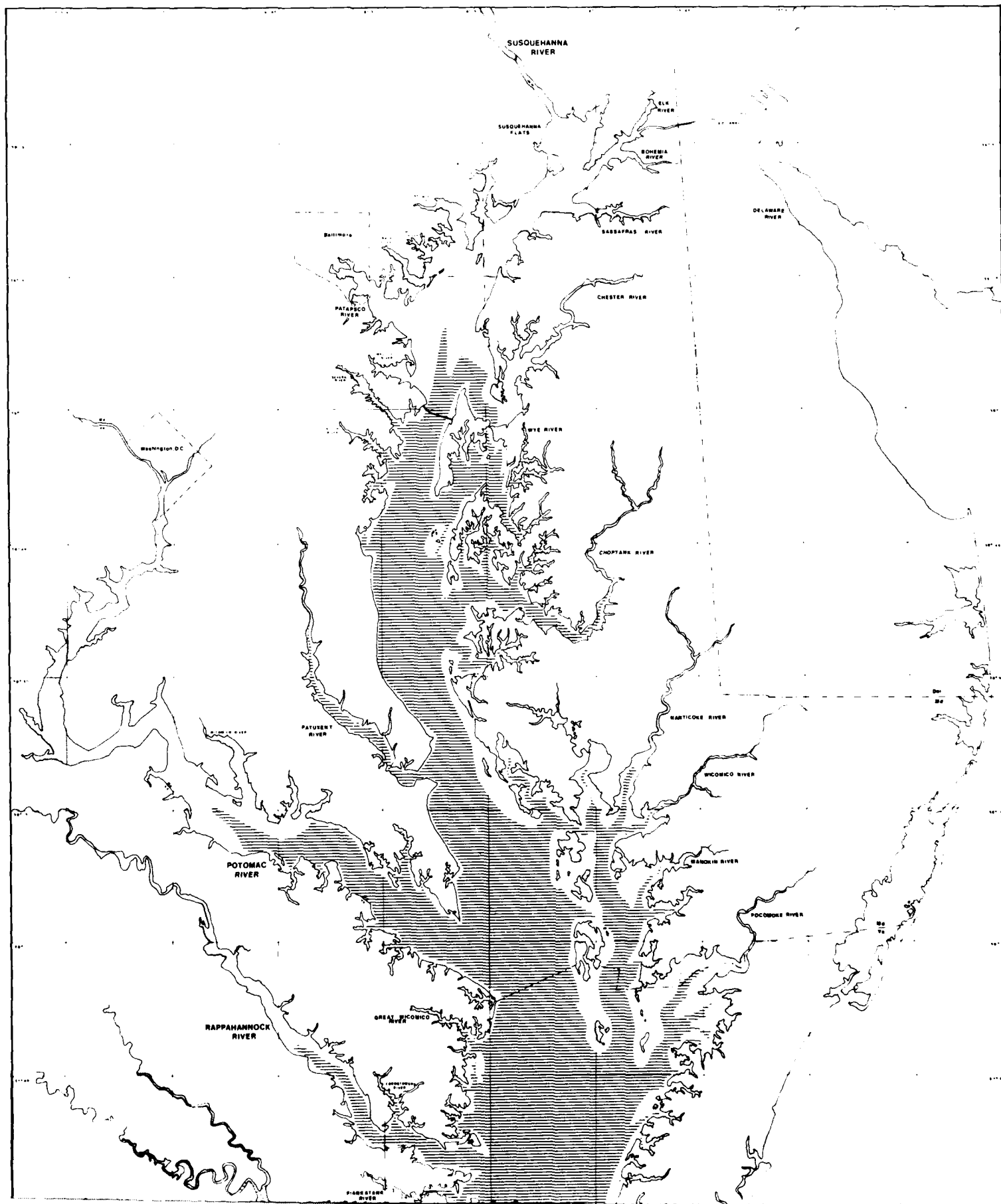


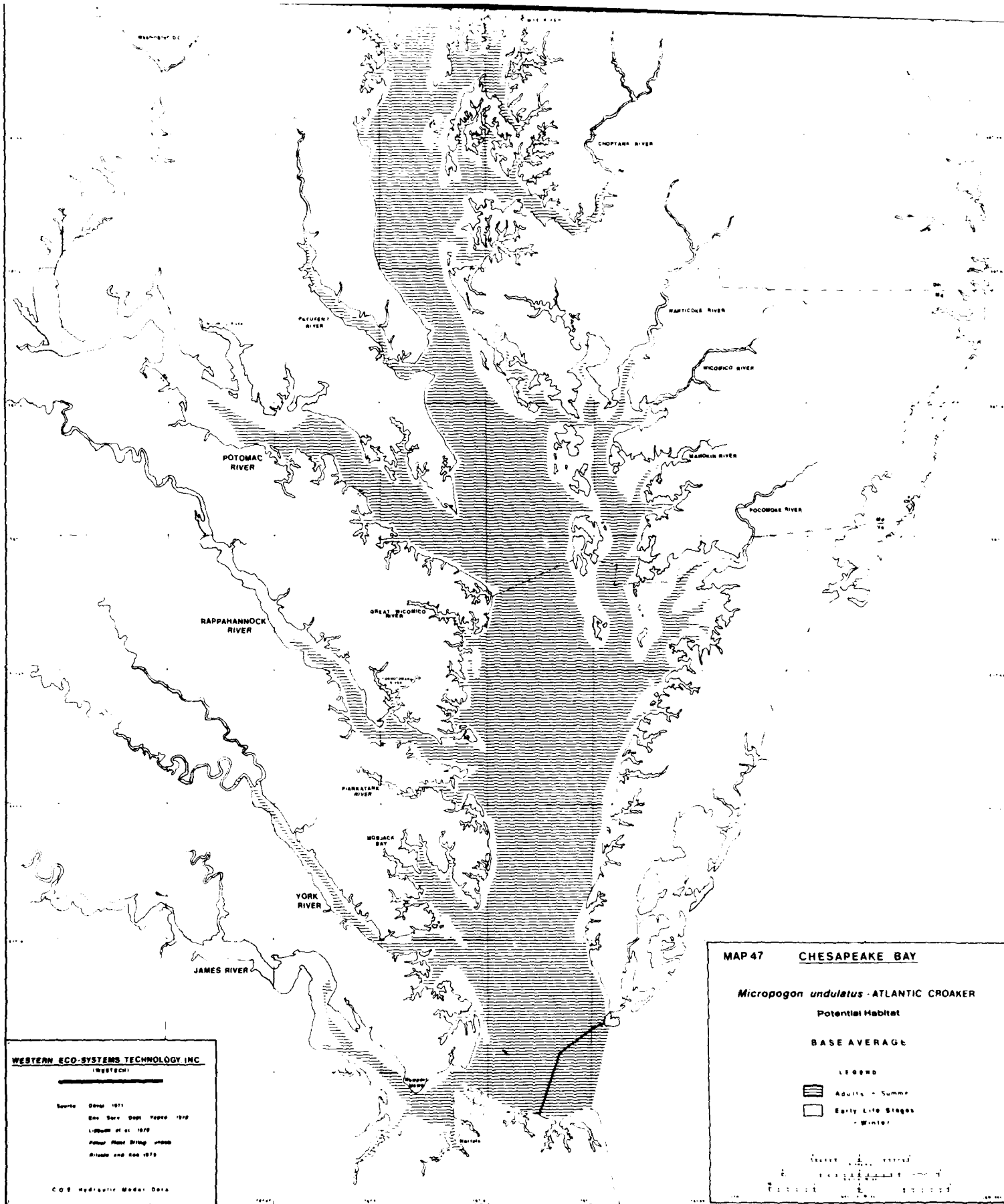












SUSQUEHANNA RIVER

SUSQUEHANNA PLATS

ELK RIVER

BOHEMIA RIVER

DELAWARE RIVER

SASSAFRAS RIVER

Baltimore

CHESTER RIVER

PATAPSCO RIVER

TOWNE RIVER

Washington D.C.

CHOPTANK RIVER

PATUXENT RIVER

NANTICORE RIVER

WICOMICO RIVER

POTOMAC RIVER

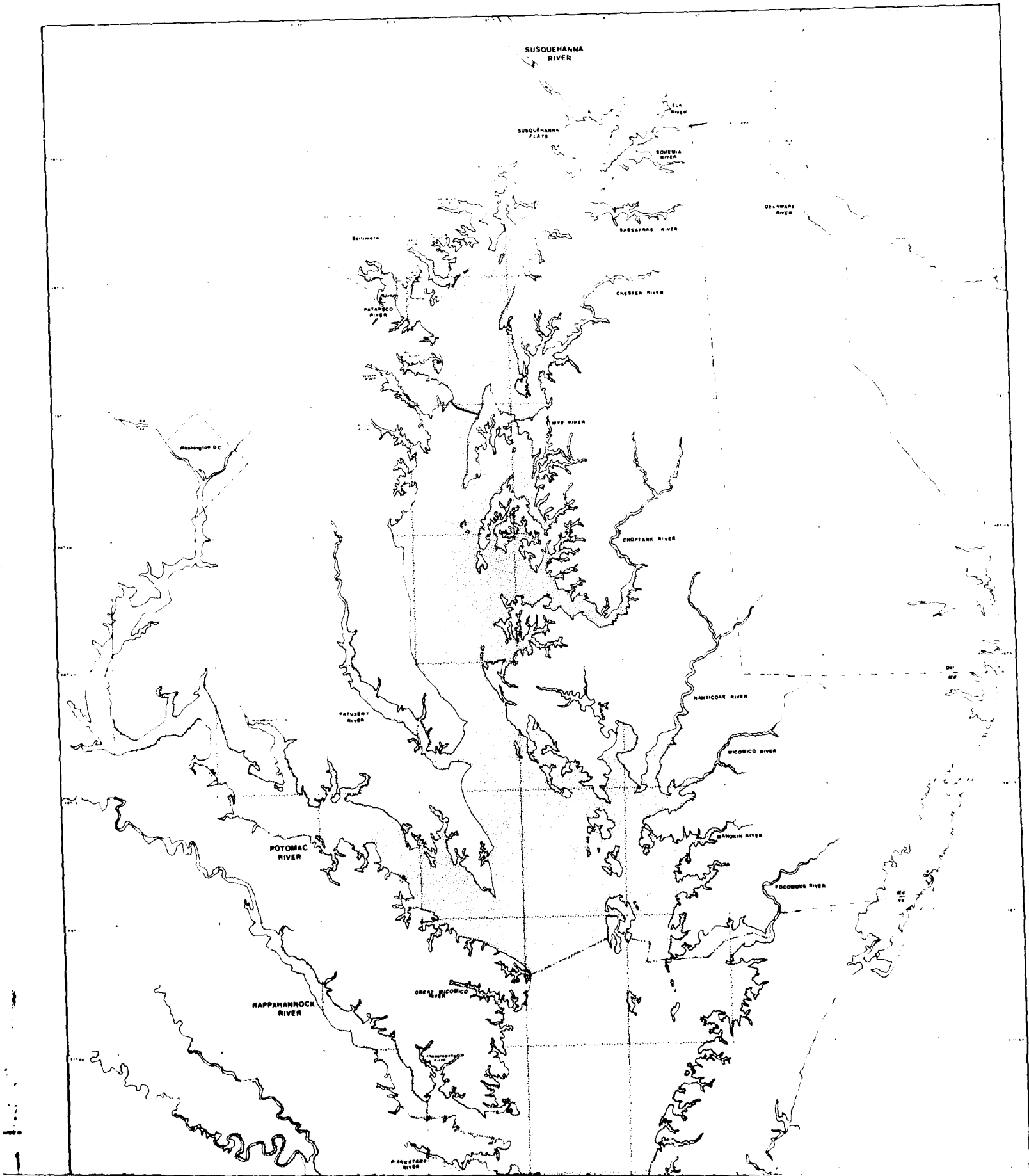
ANNOKE RIVER

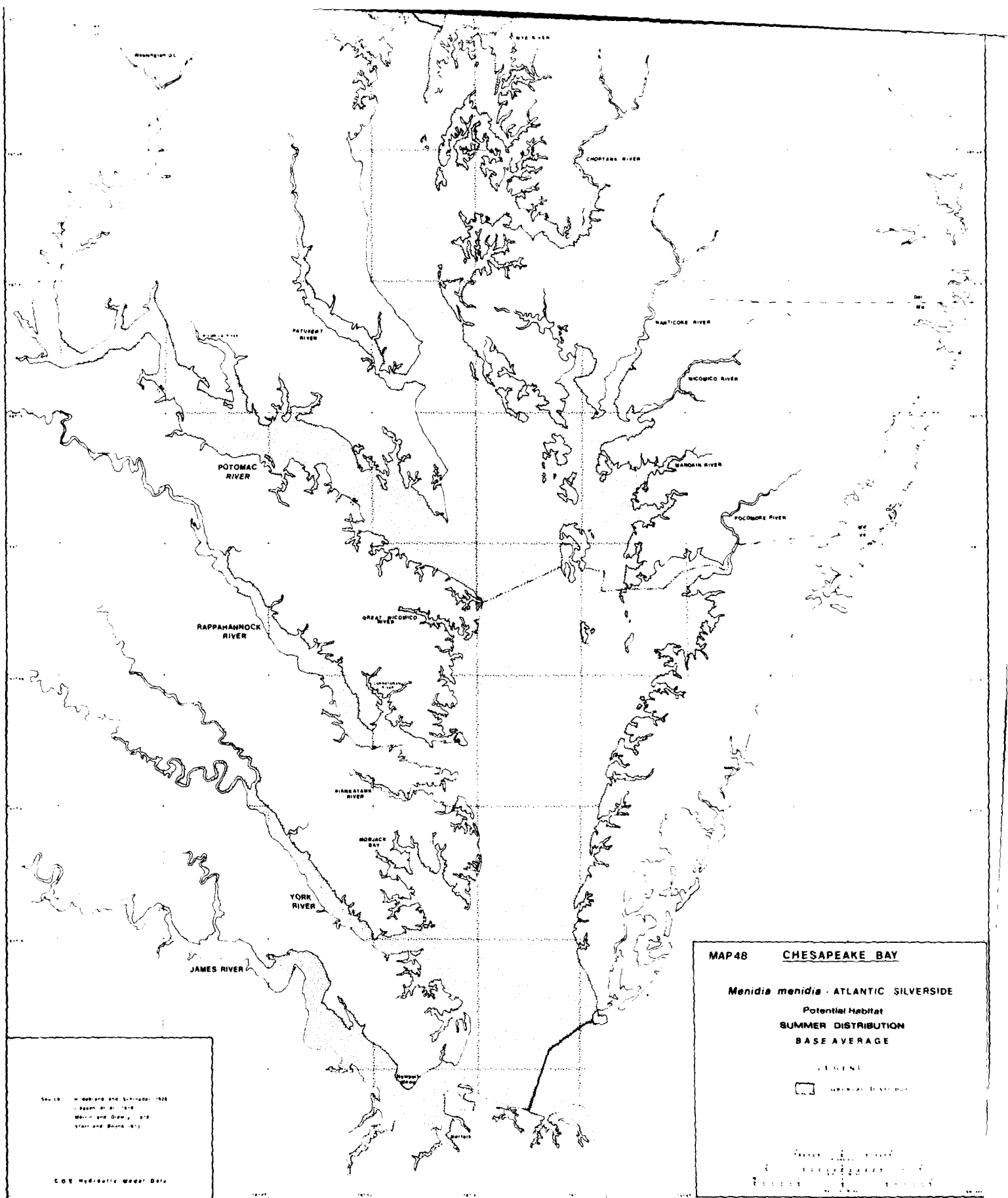
POCOMORE RIVER

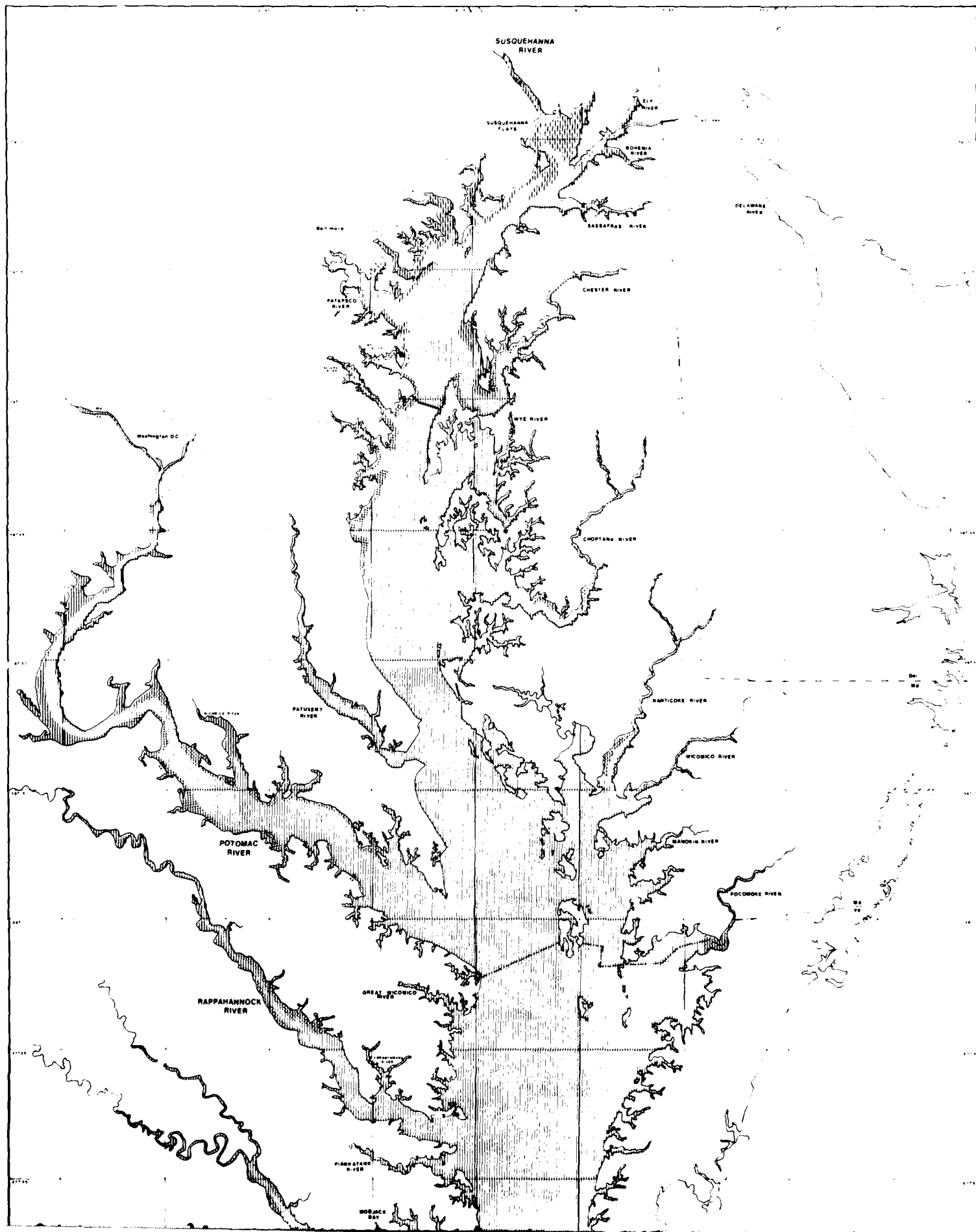
RAPPAHANNOCK RIVER

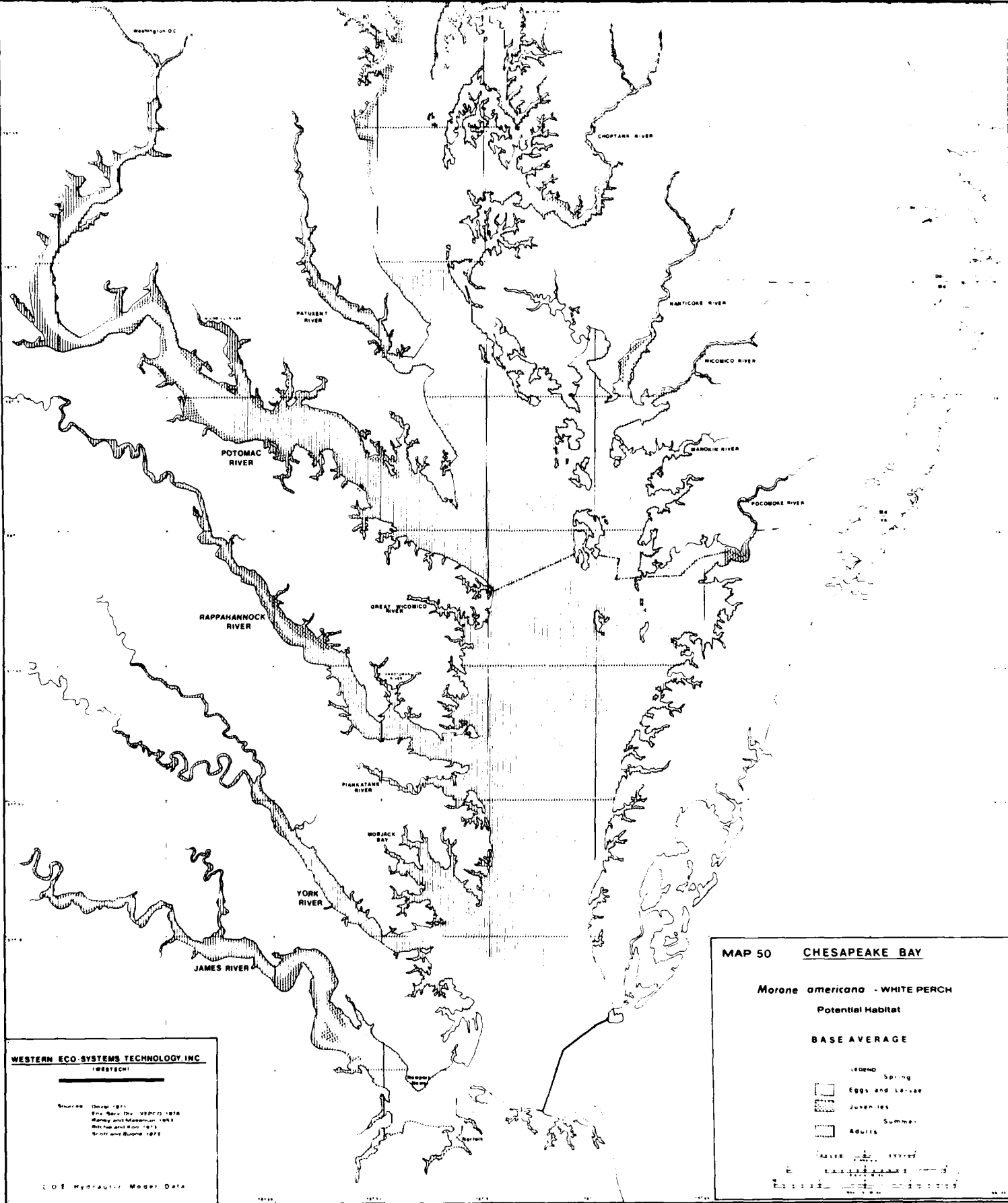
ORIAL WICOMICO RIVER

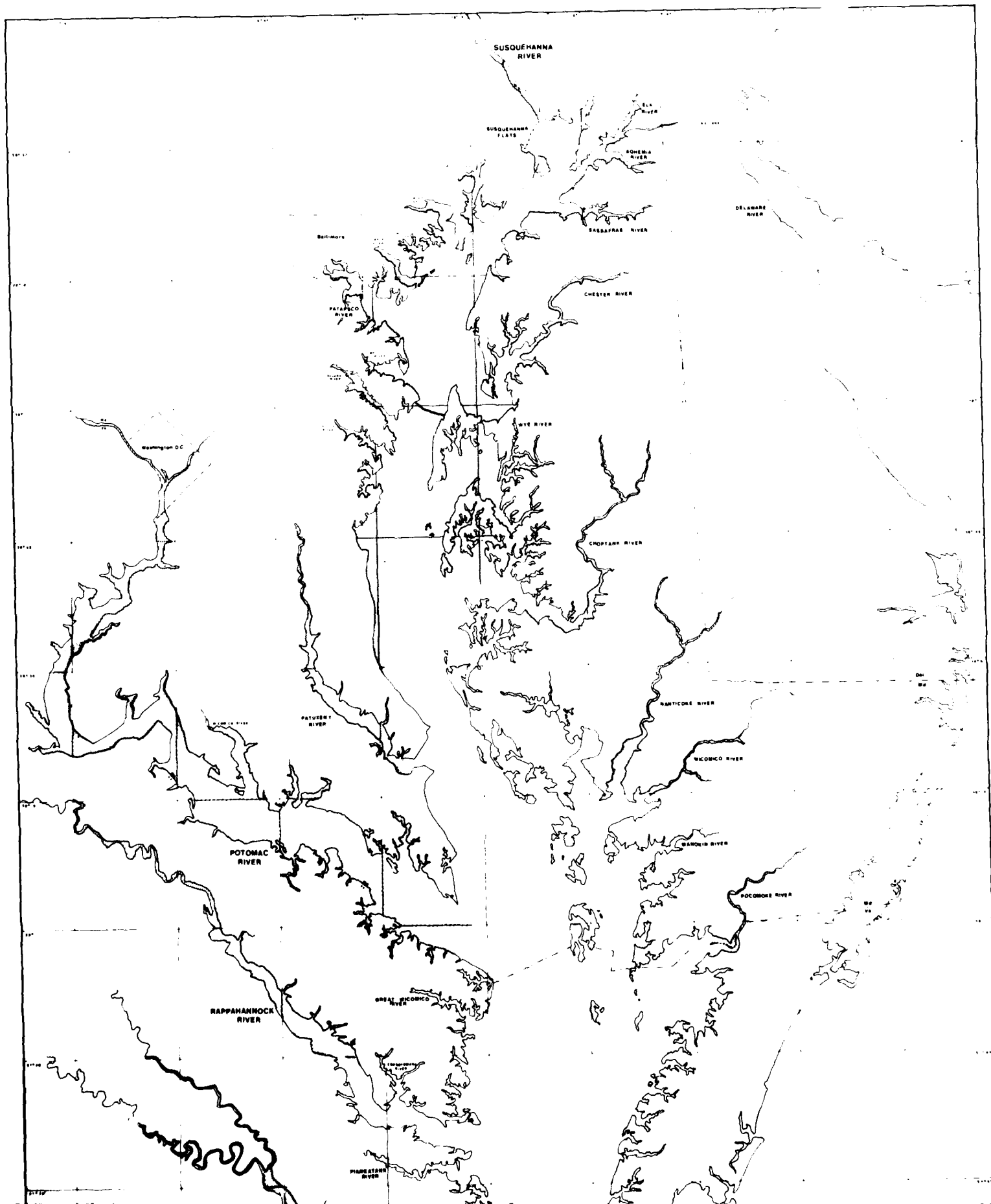
PIKESTAR RIVER

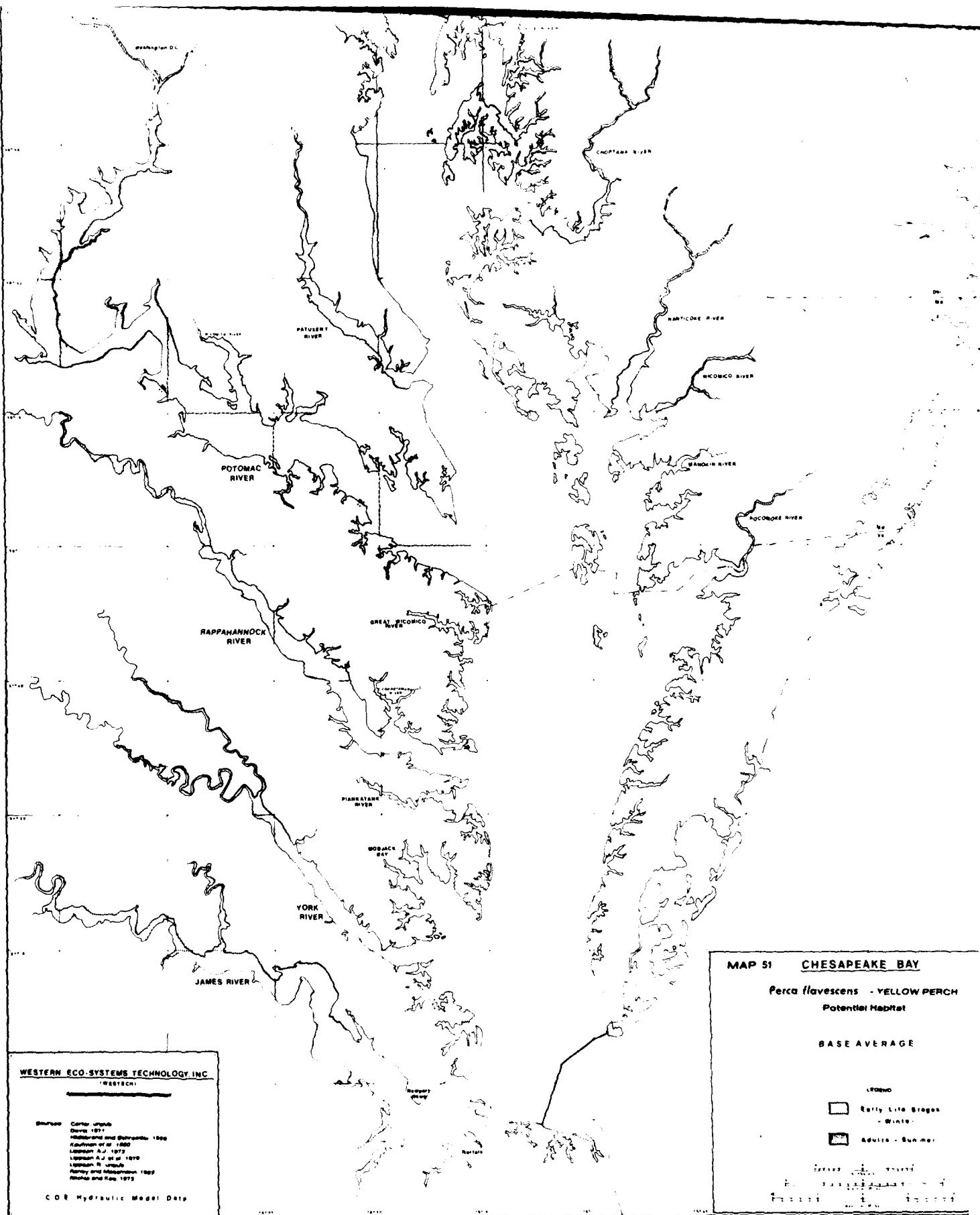


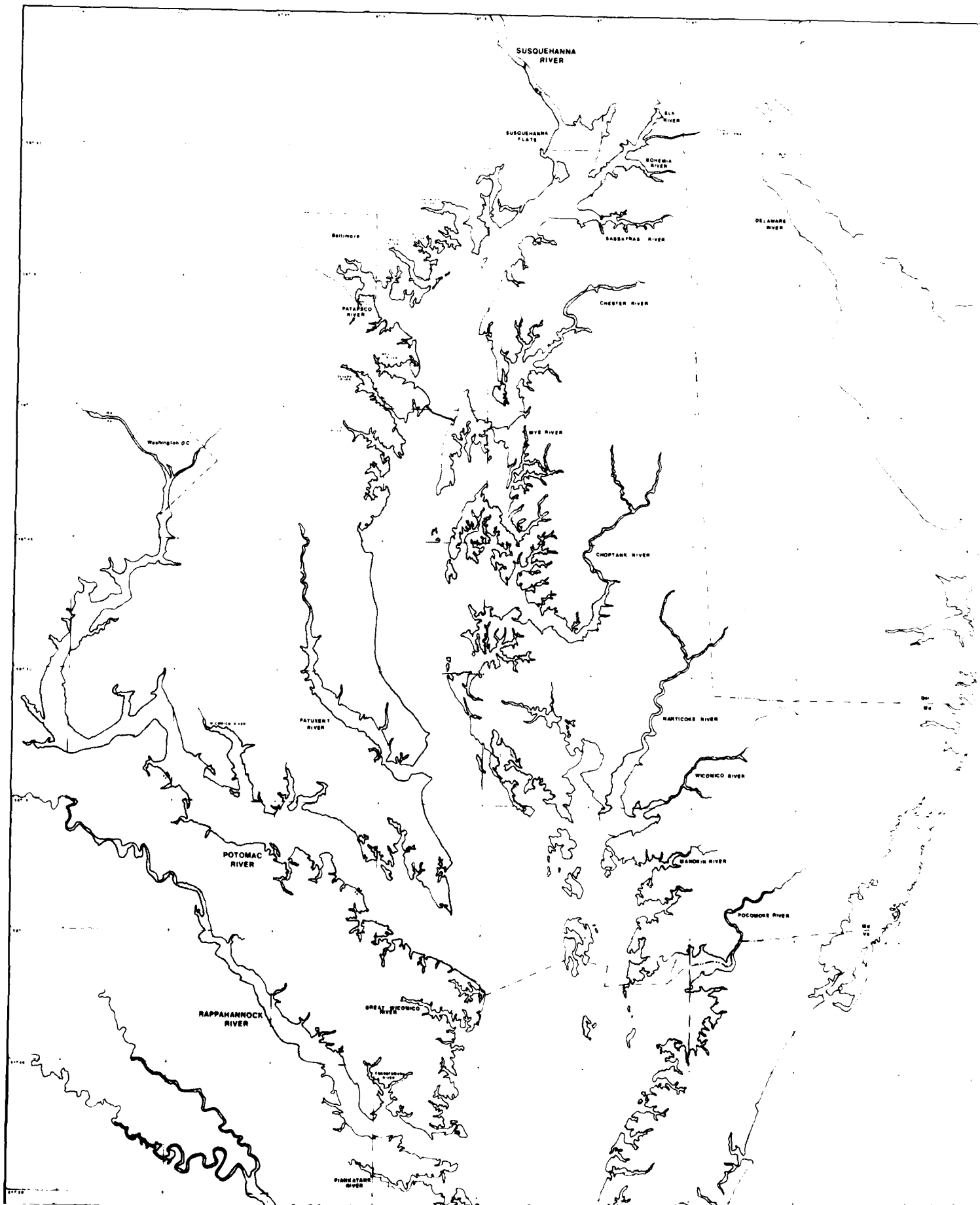


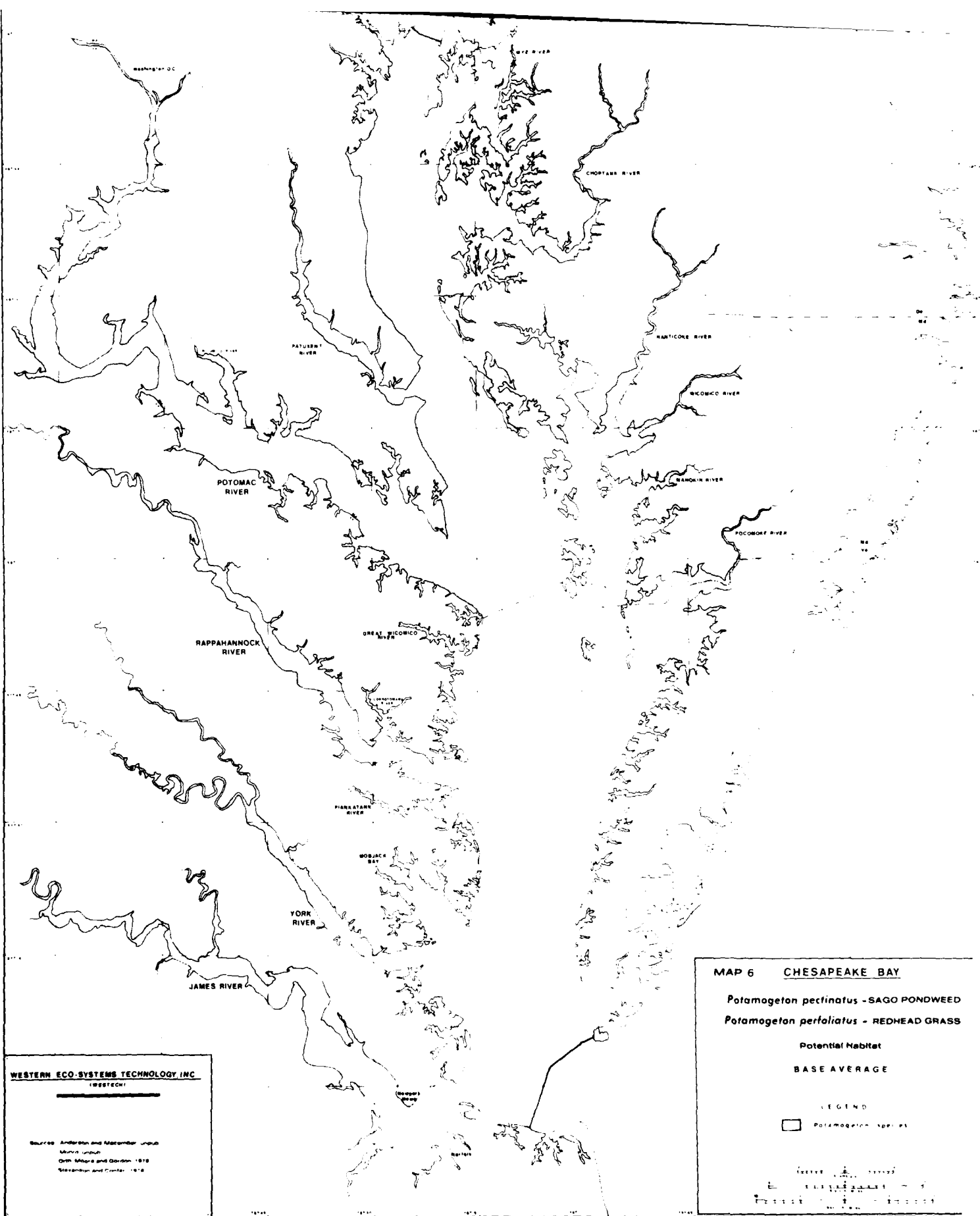














NO A61 483

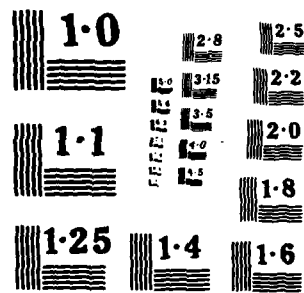
CHESAPEAKE BAY LOW FRESHWATER INFLOW STUDY APPENDIX F
MAP FOLIO (U) CORPS OF ENGINEERS BALTIMORE MD BALTIMORE
DISTRICT SEP 84 CHB-84-L-APP-F

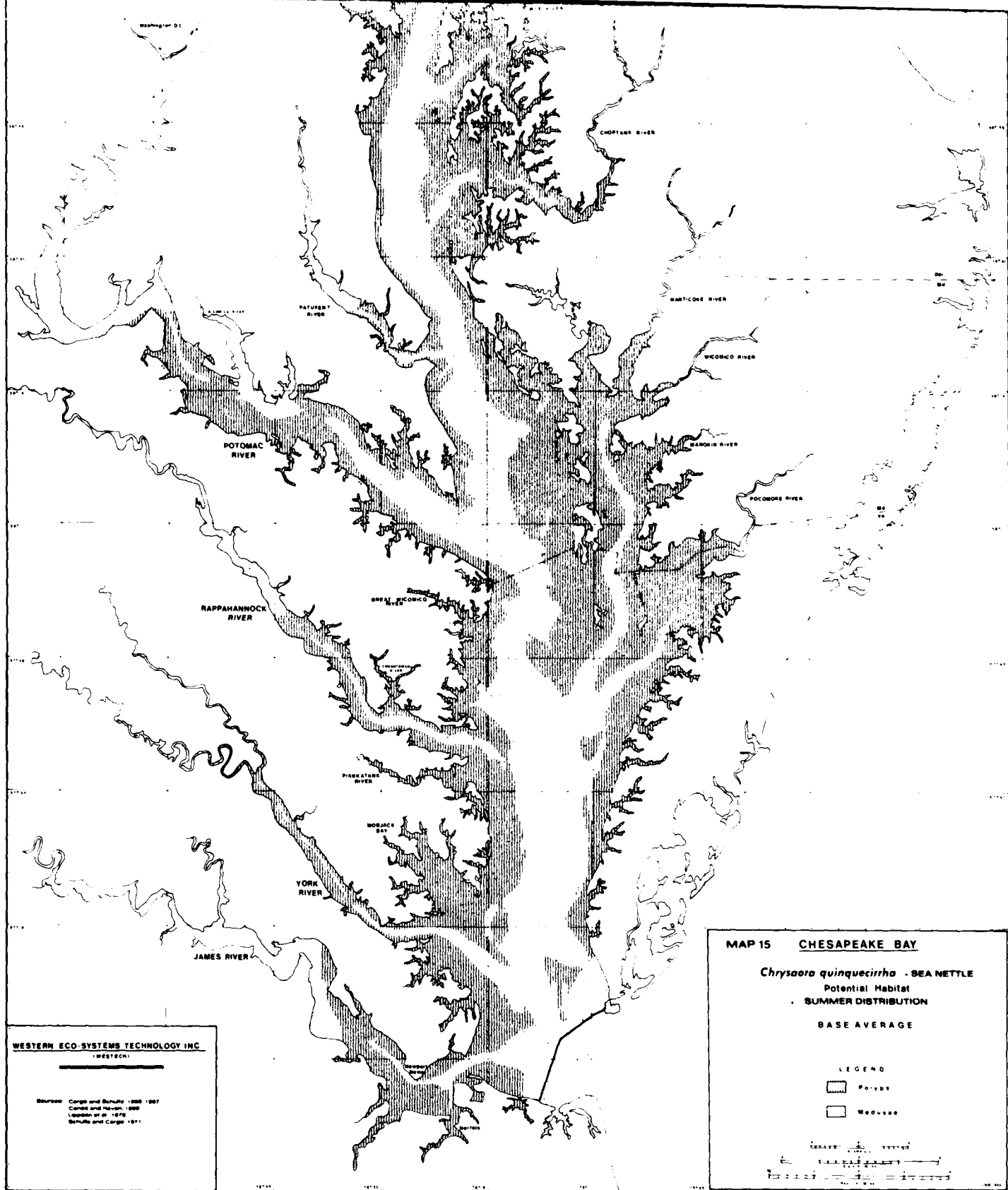
2/3

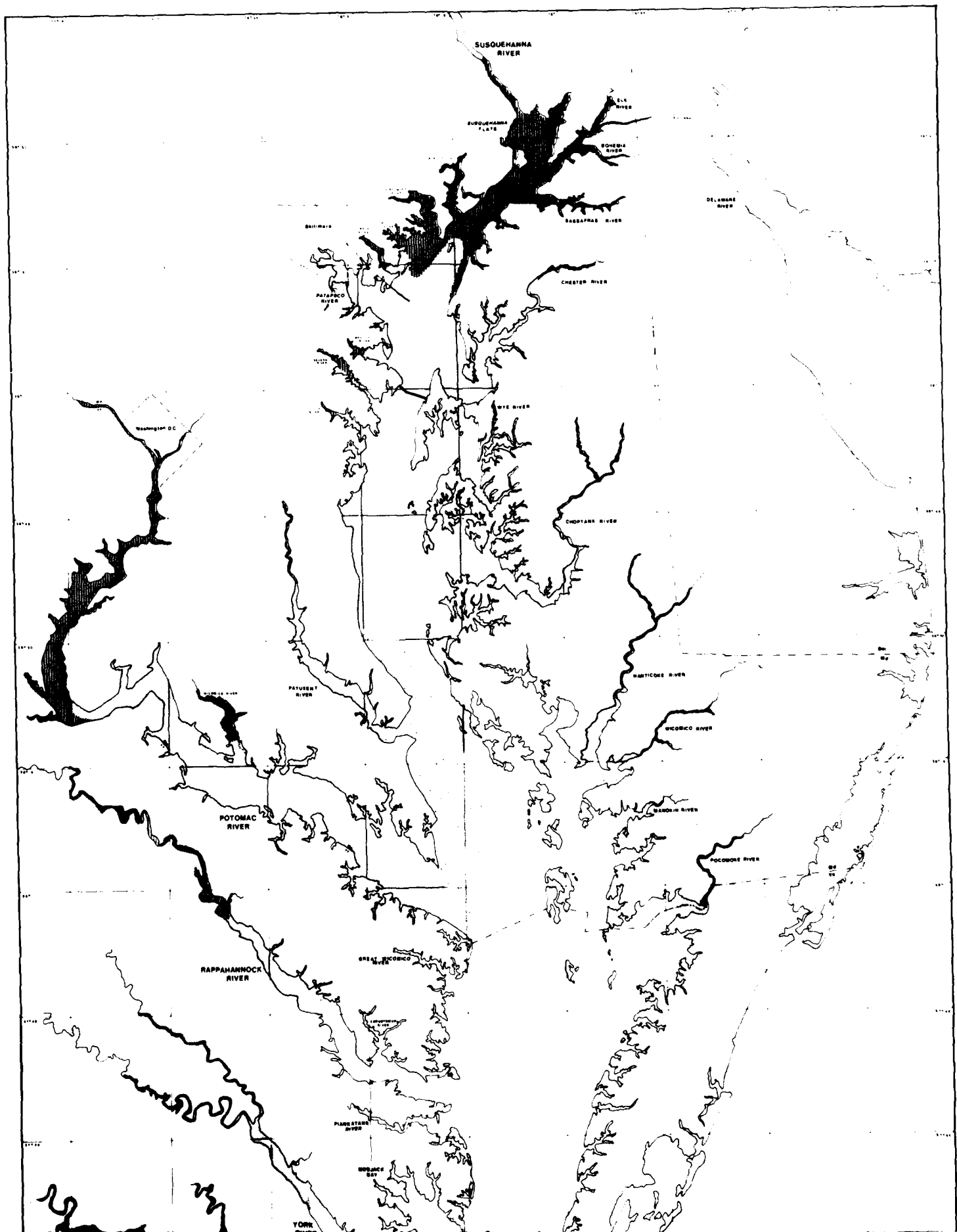
UNCLASSIFIED

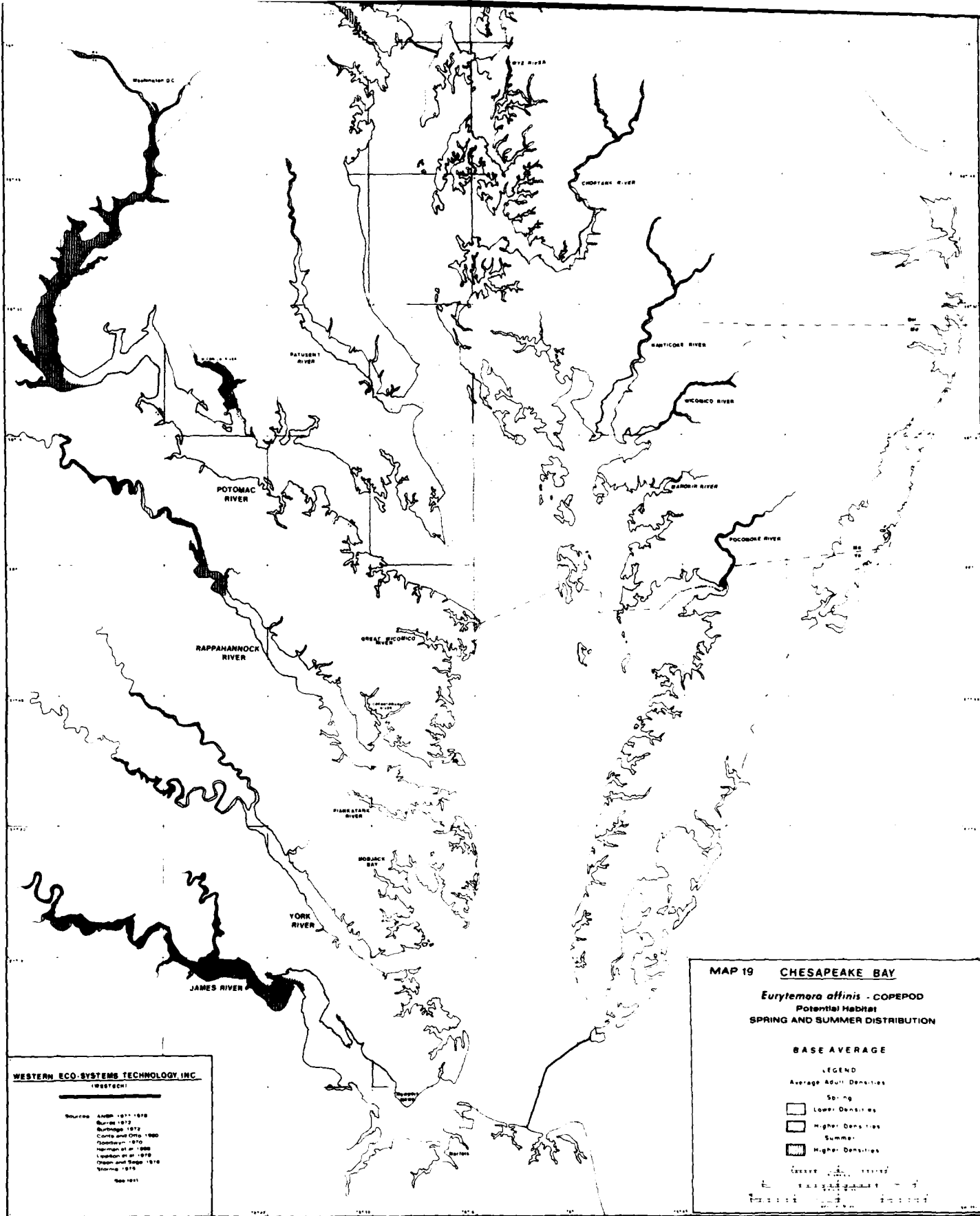
F/G 8/1

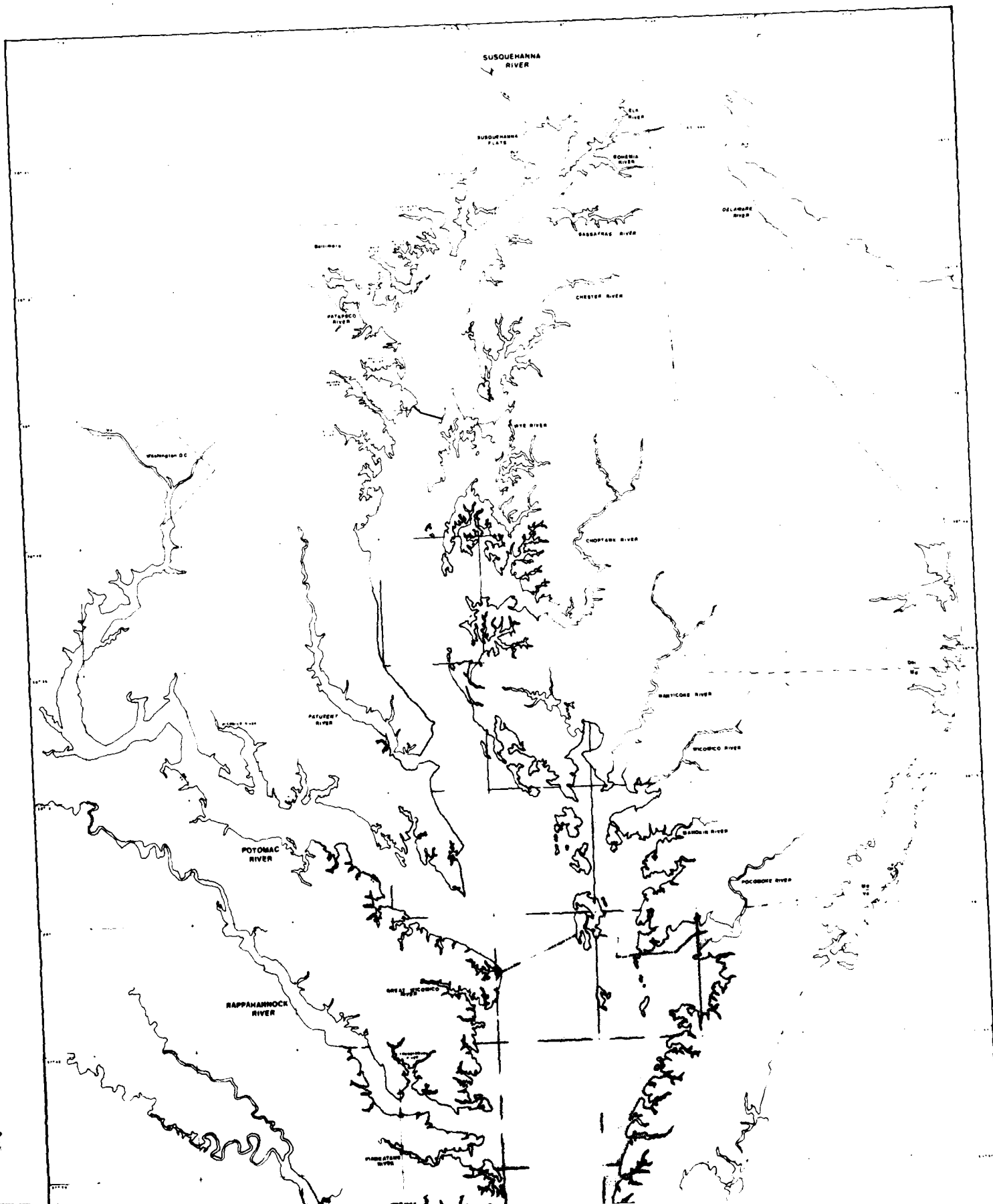
11

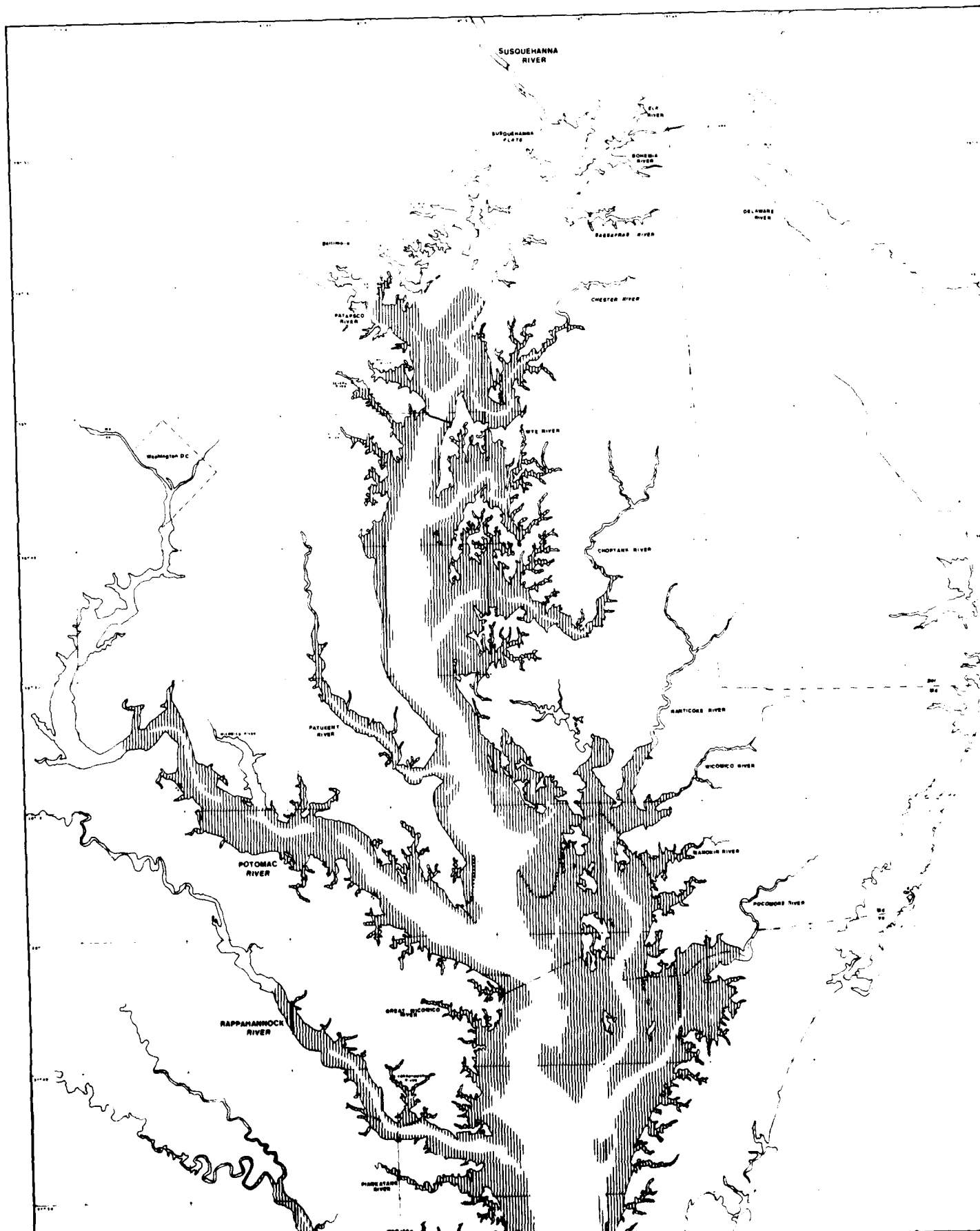


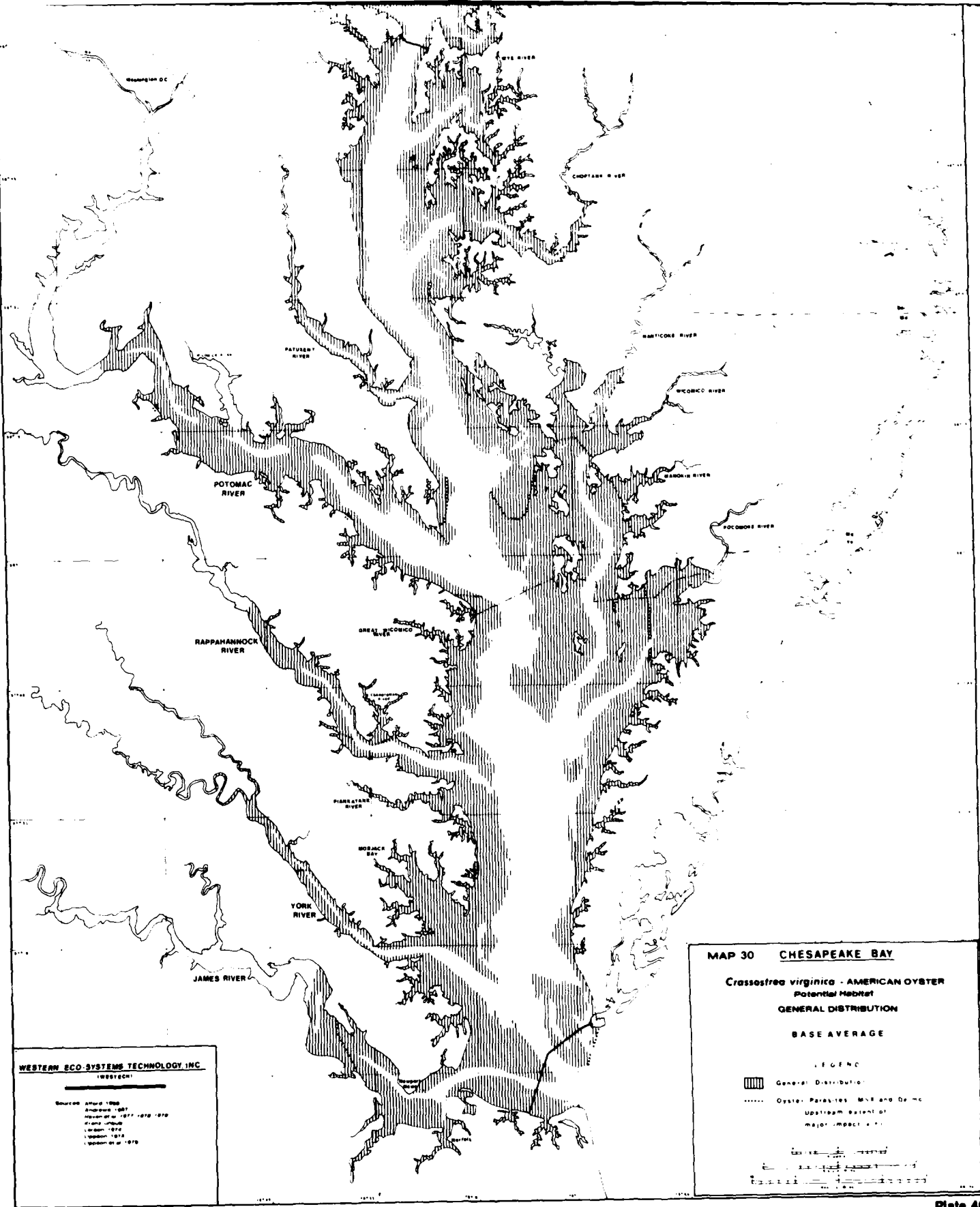


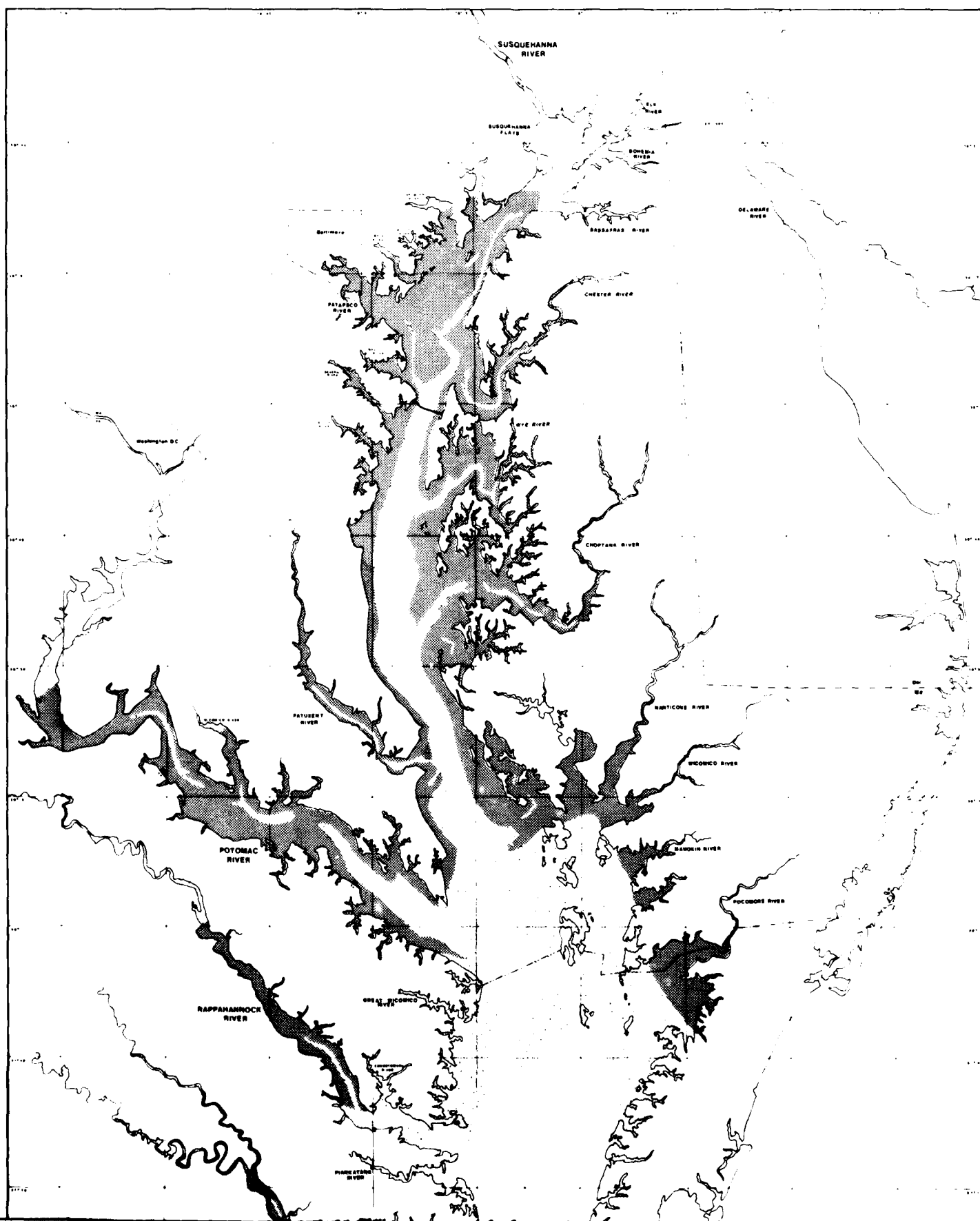


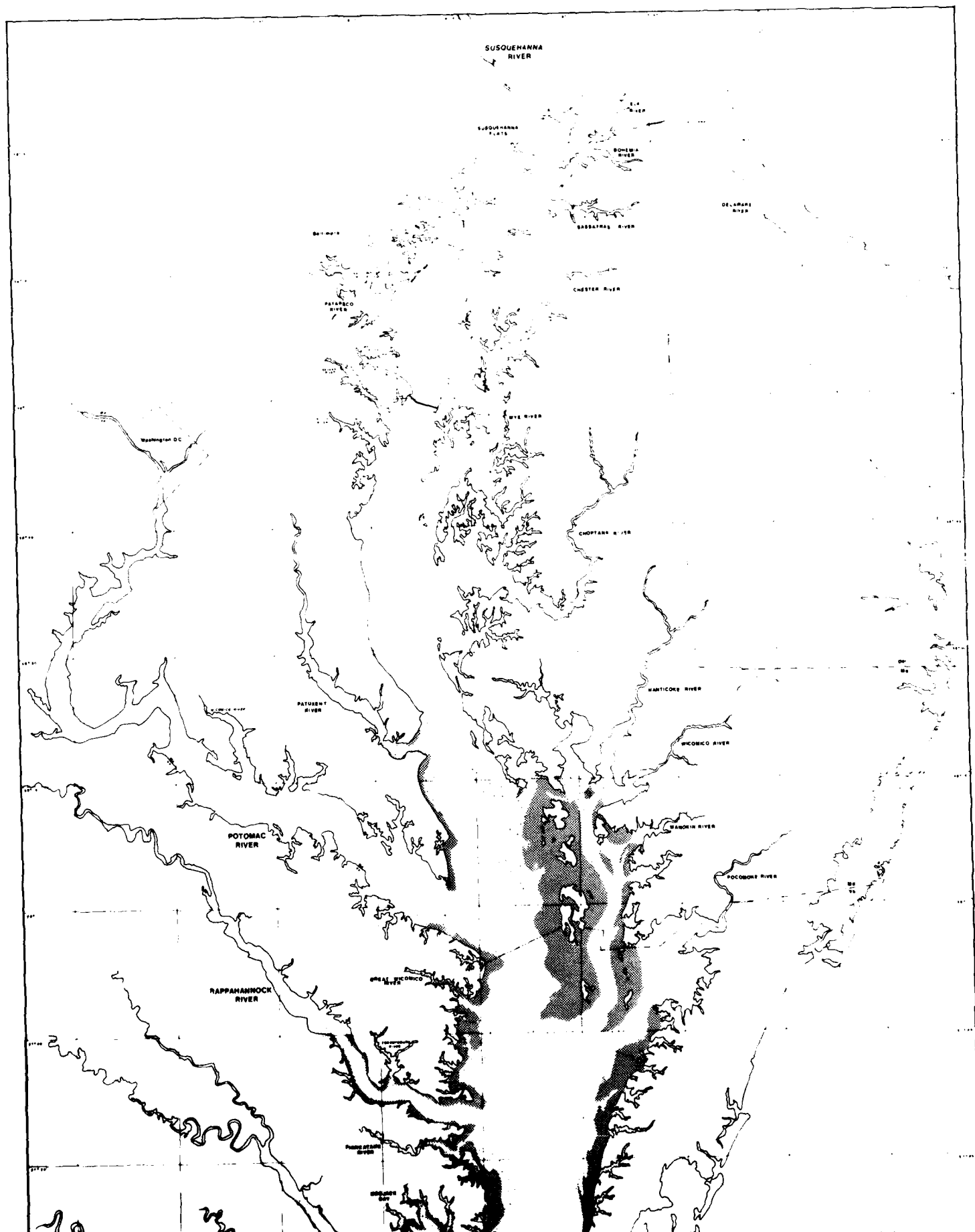


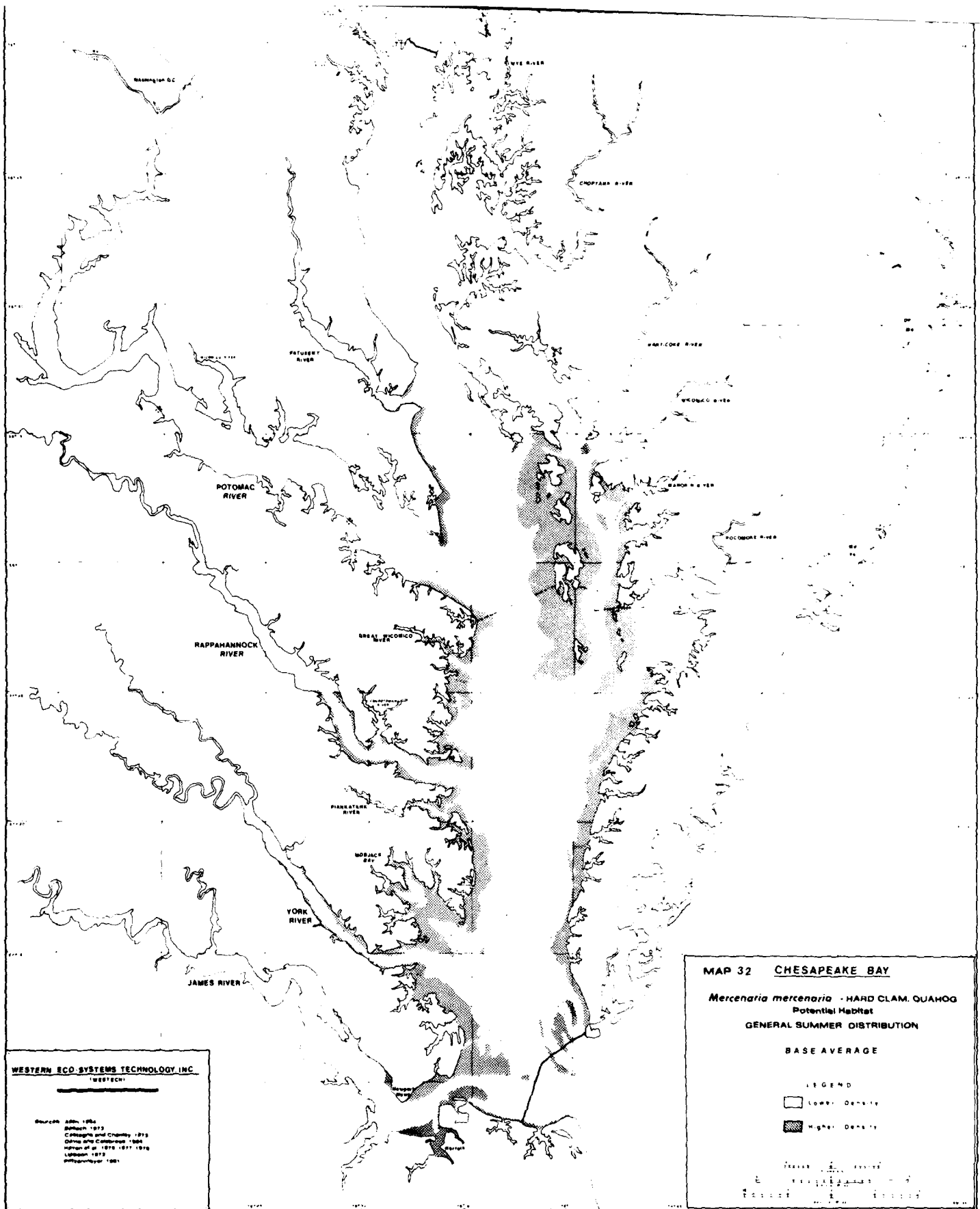




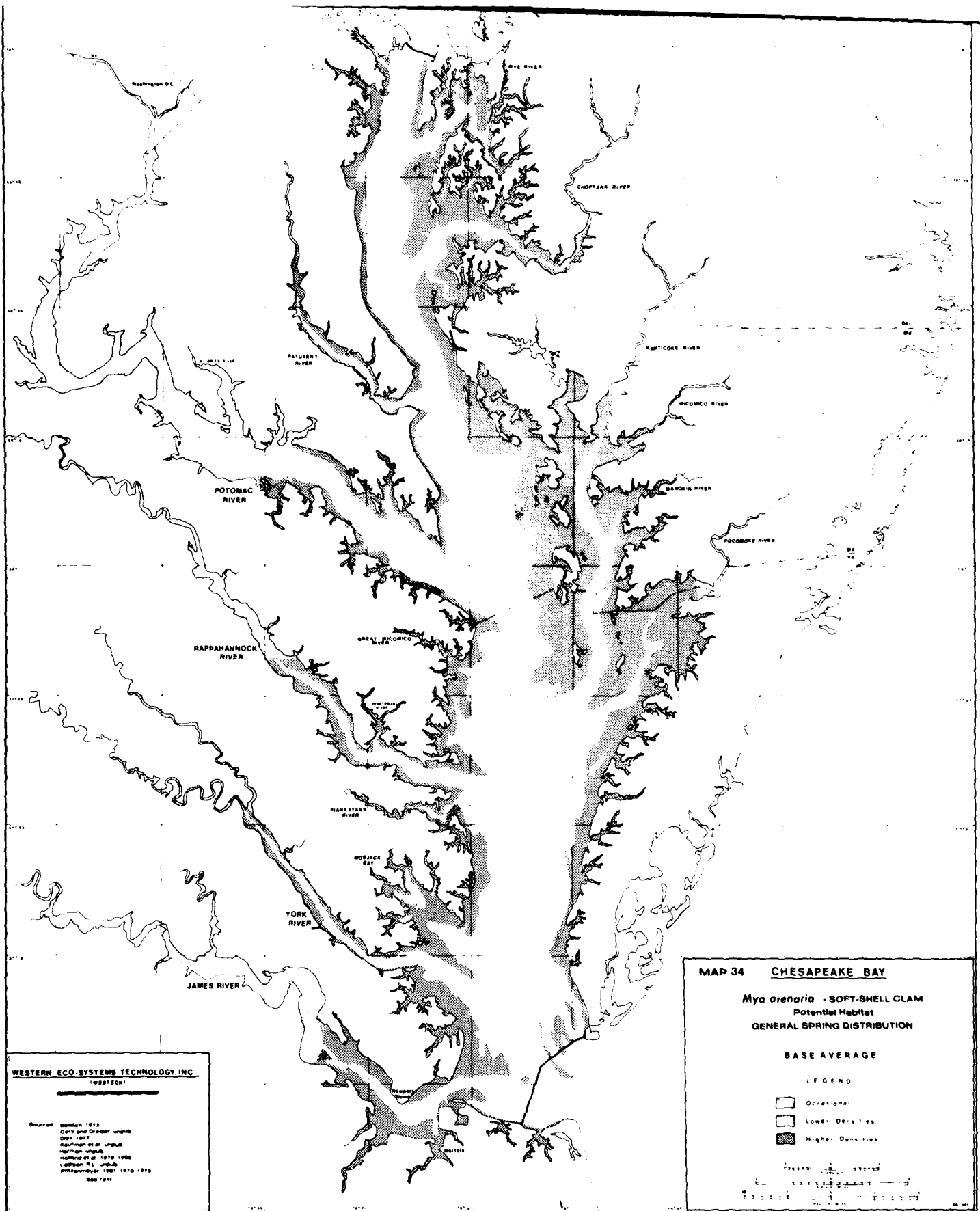


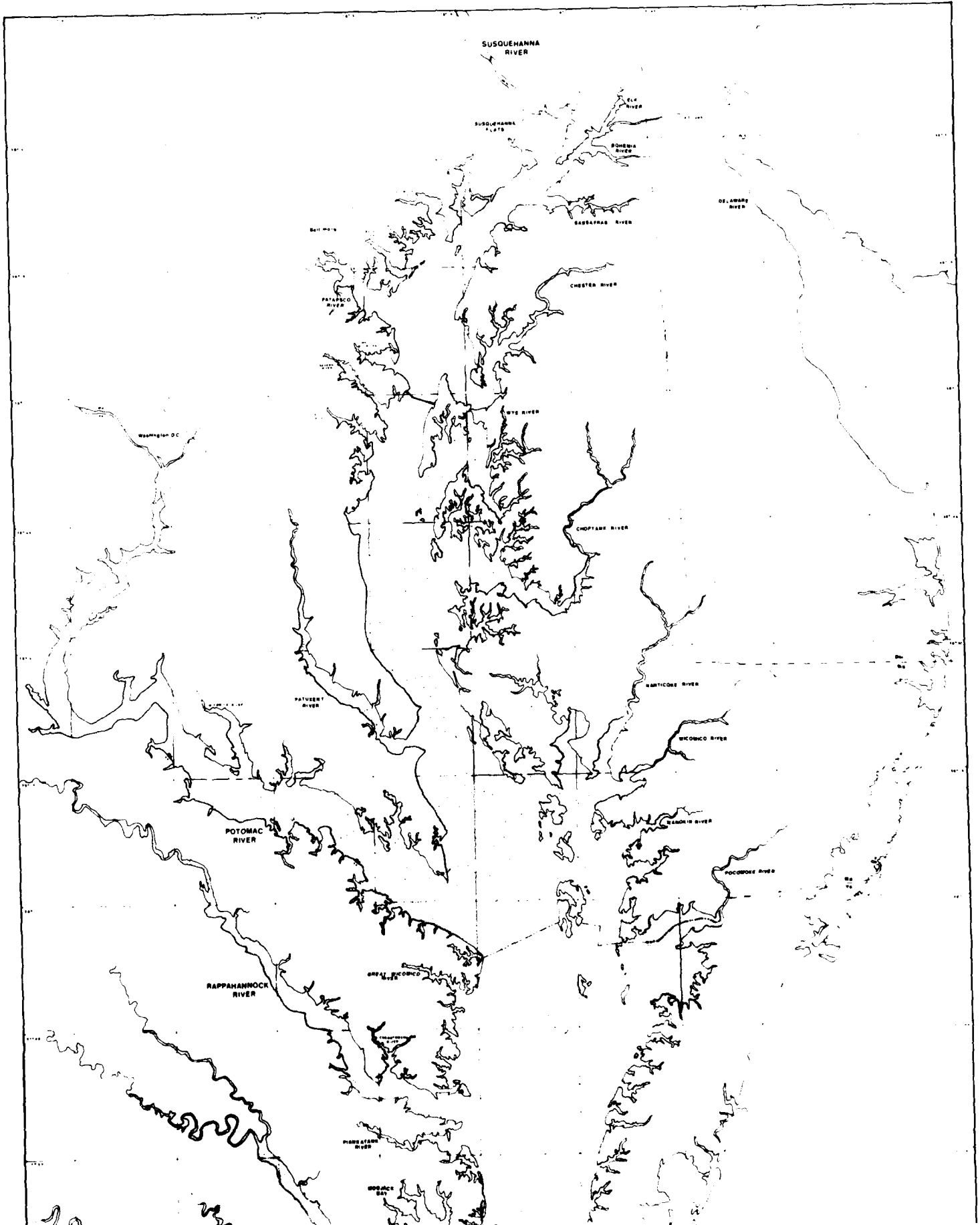


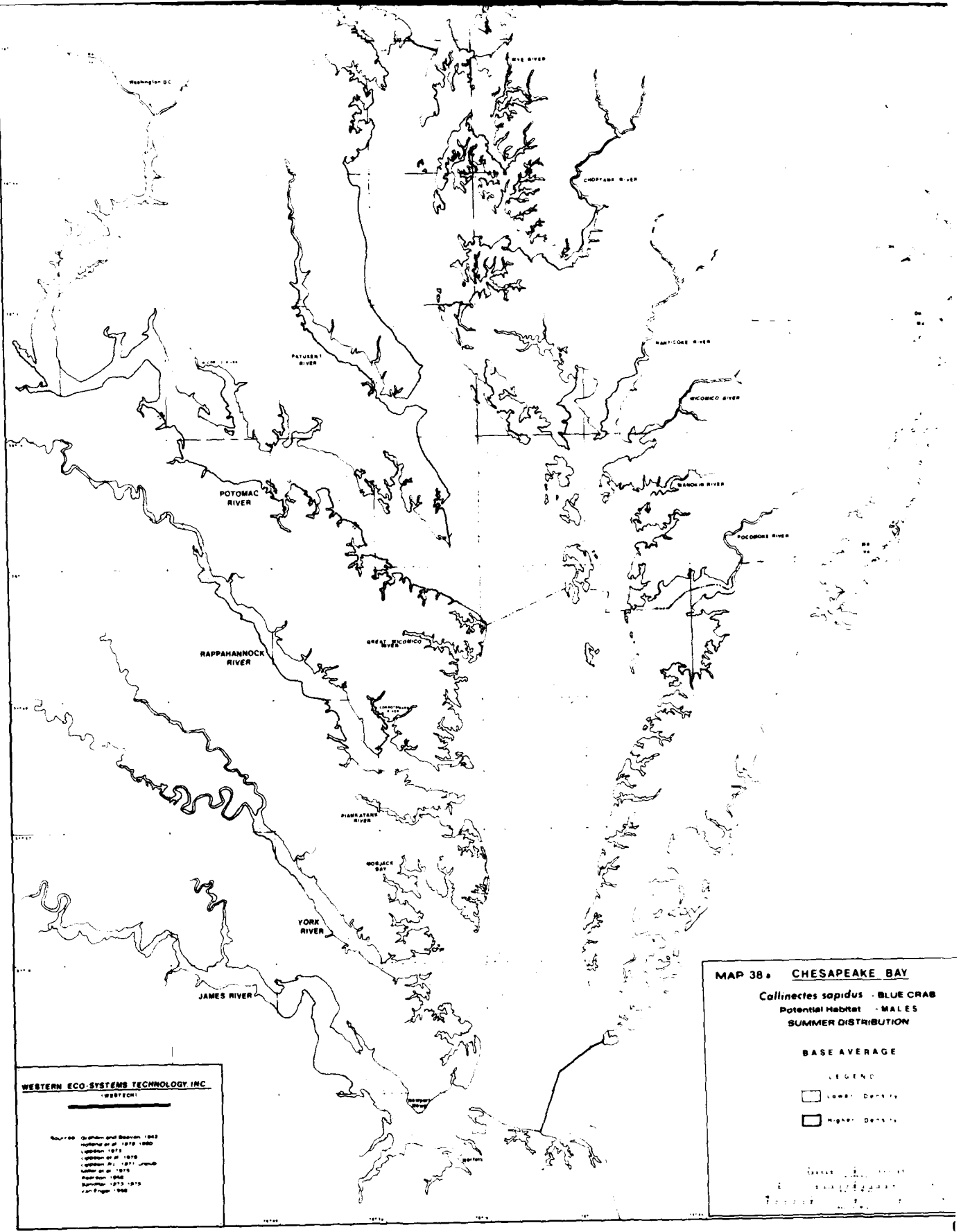












WESTERN ECO-SYSTEMS TECHNOLOGY, INC.
(WESTECH)

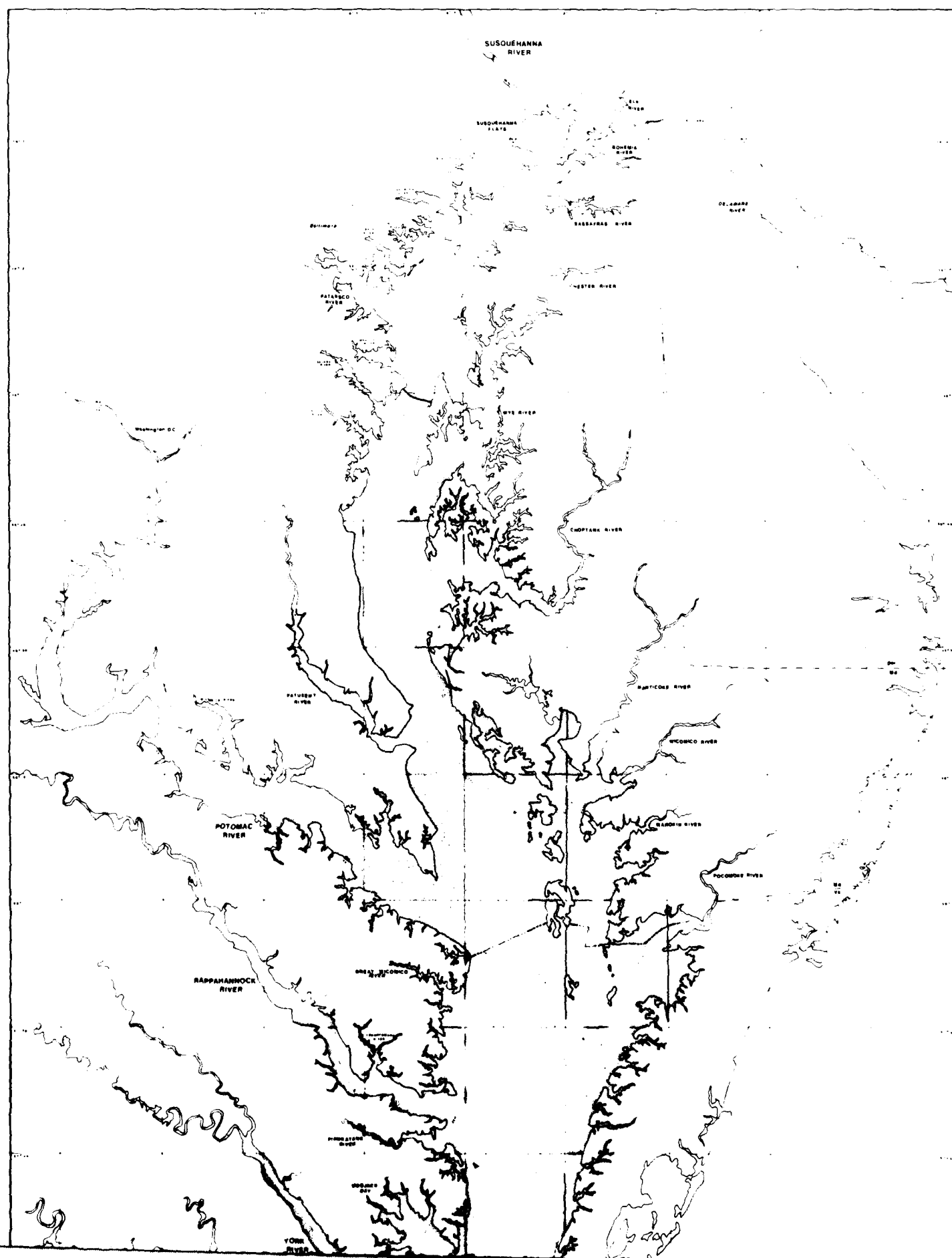
Scale: 1:50,000
Data: 1975
Map: 1975
Base: 1975
Scale: 1:50,000
Data: 1975
Map: 1975
Base: 1975

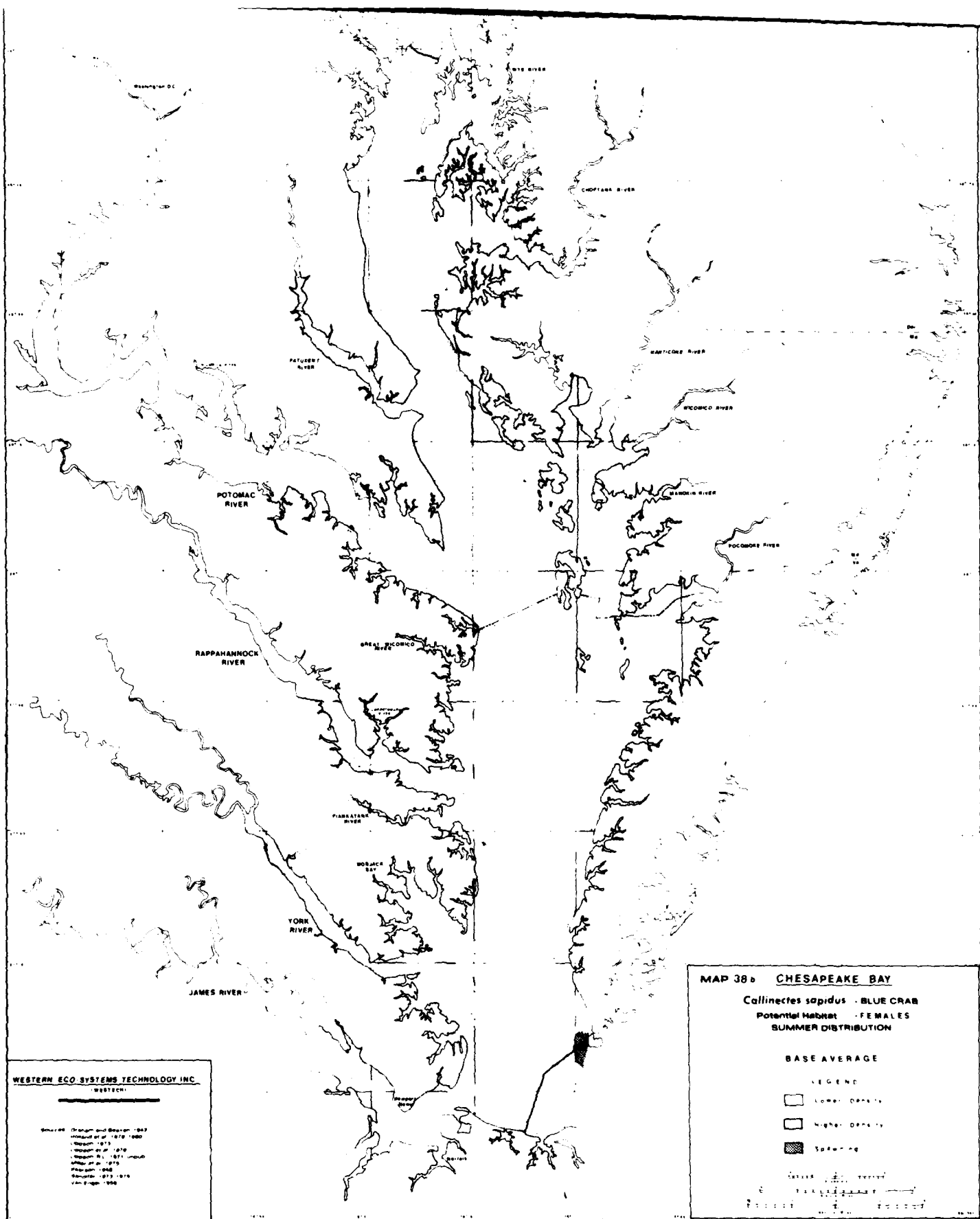
MAP 38. CHESAPEAKE BAY
Callinectes sapidus - BLUE CRAB
Potential Habitat - MALES
SUMMER DISTRIBUTION

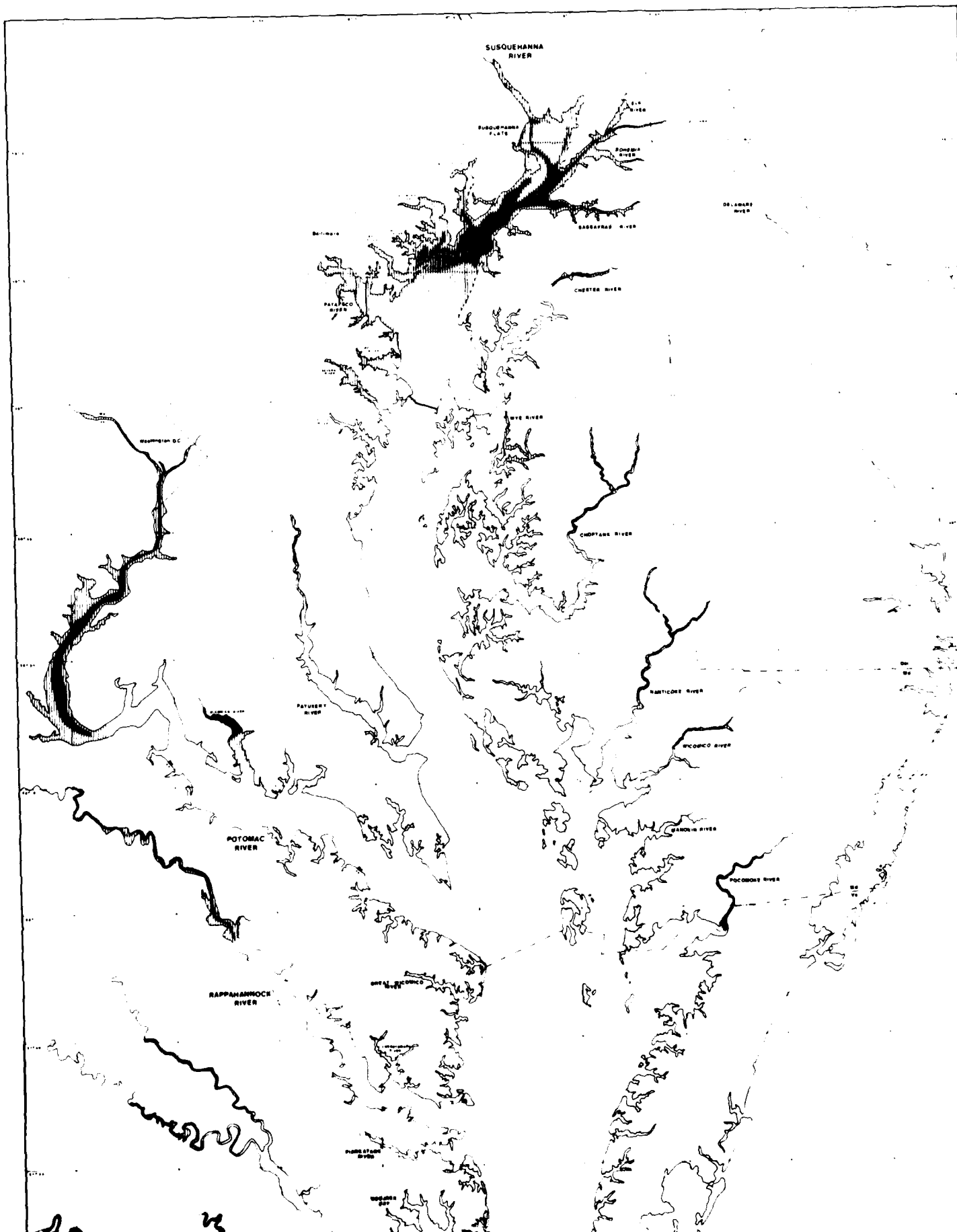
BASE AVERAGE

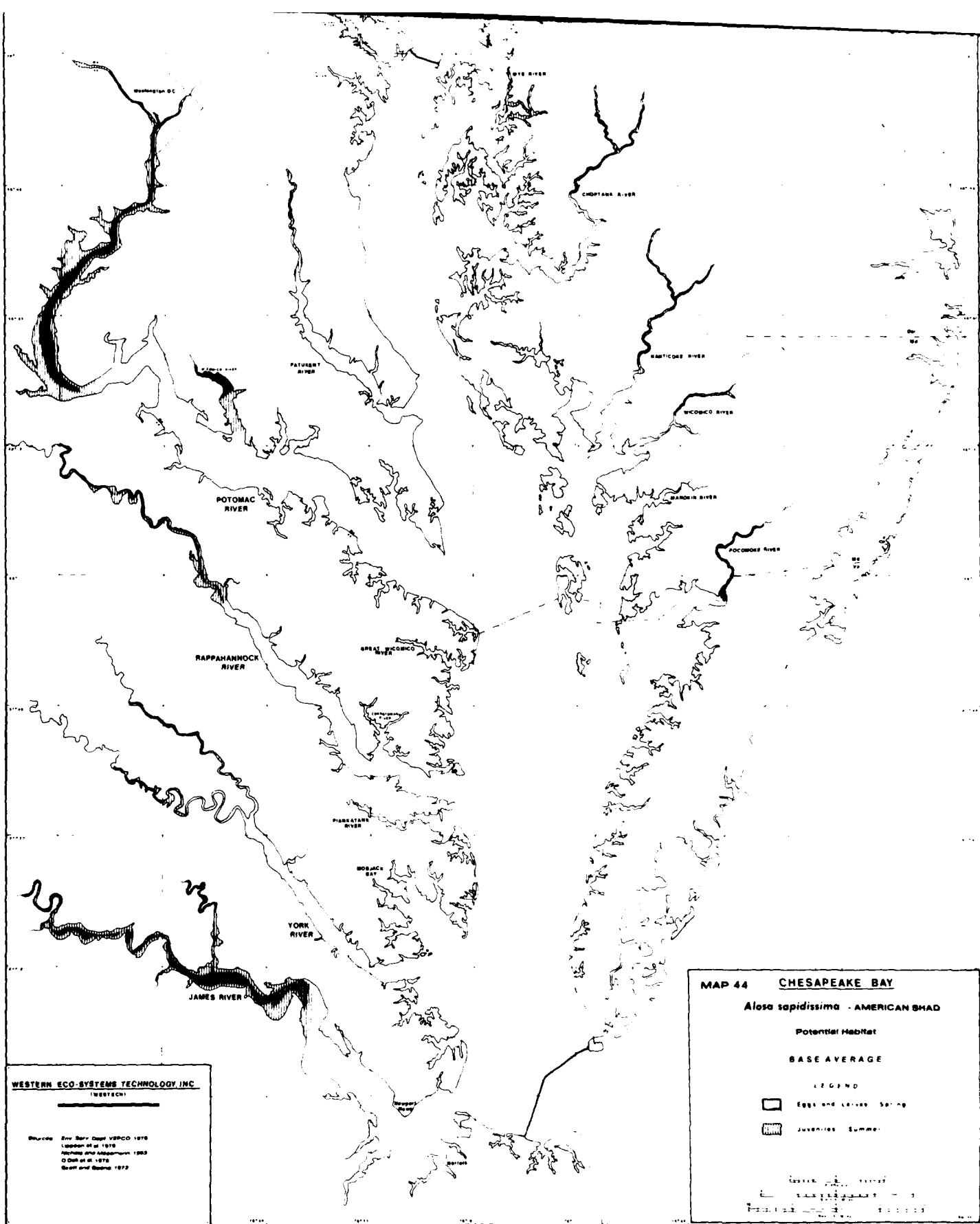
LEGEND

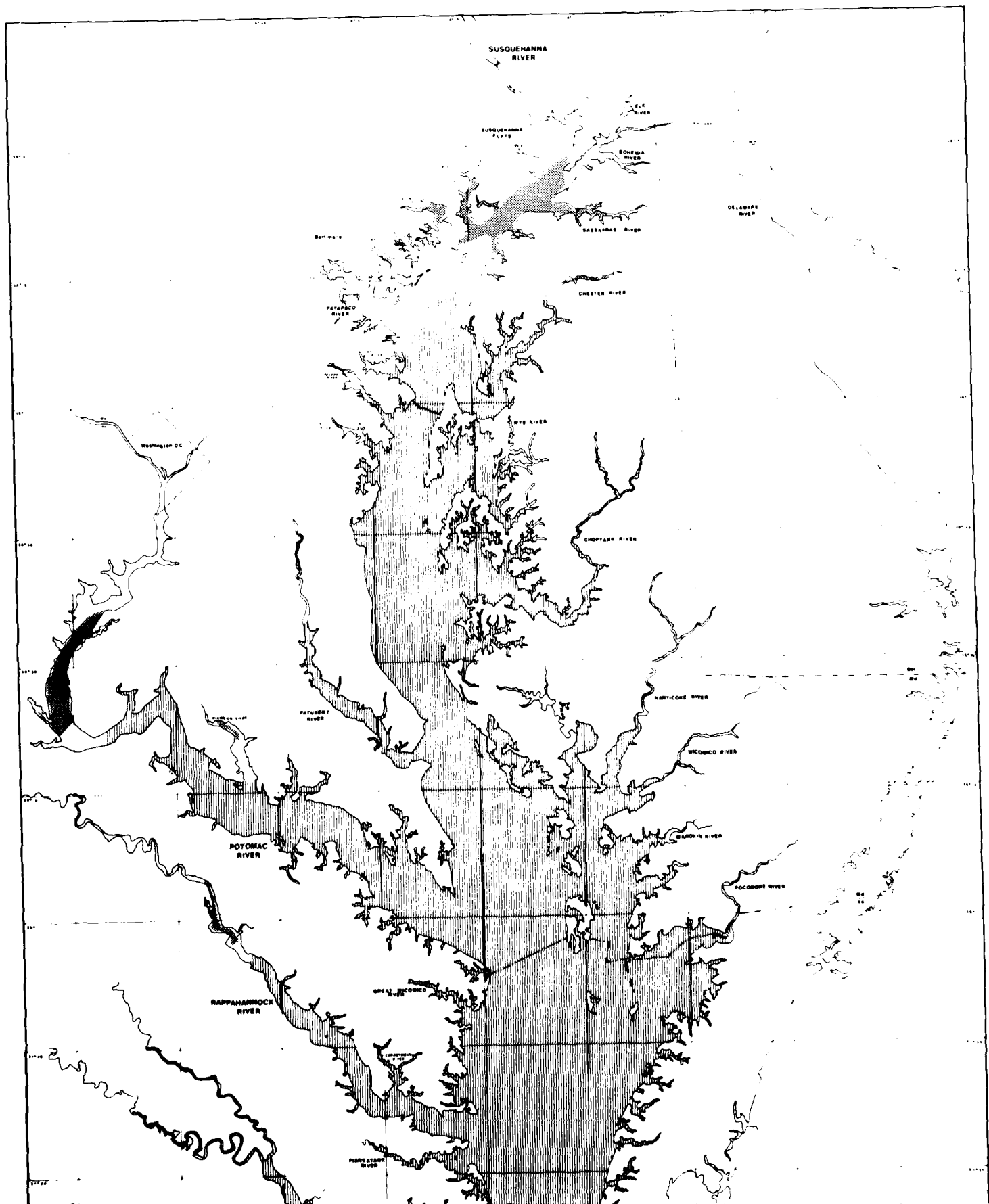
LOW DENSITY
HIGH DENSITY

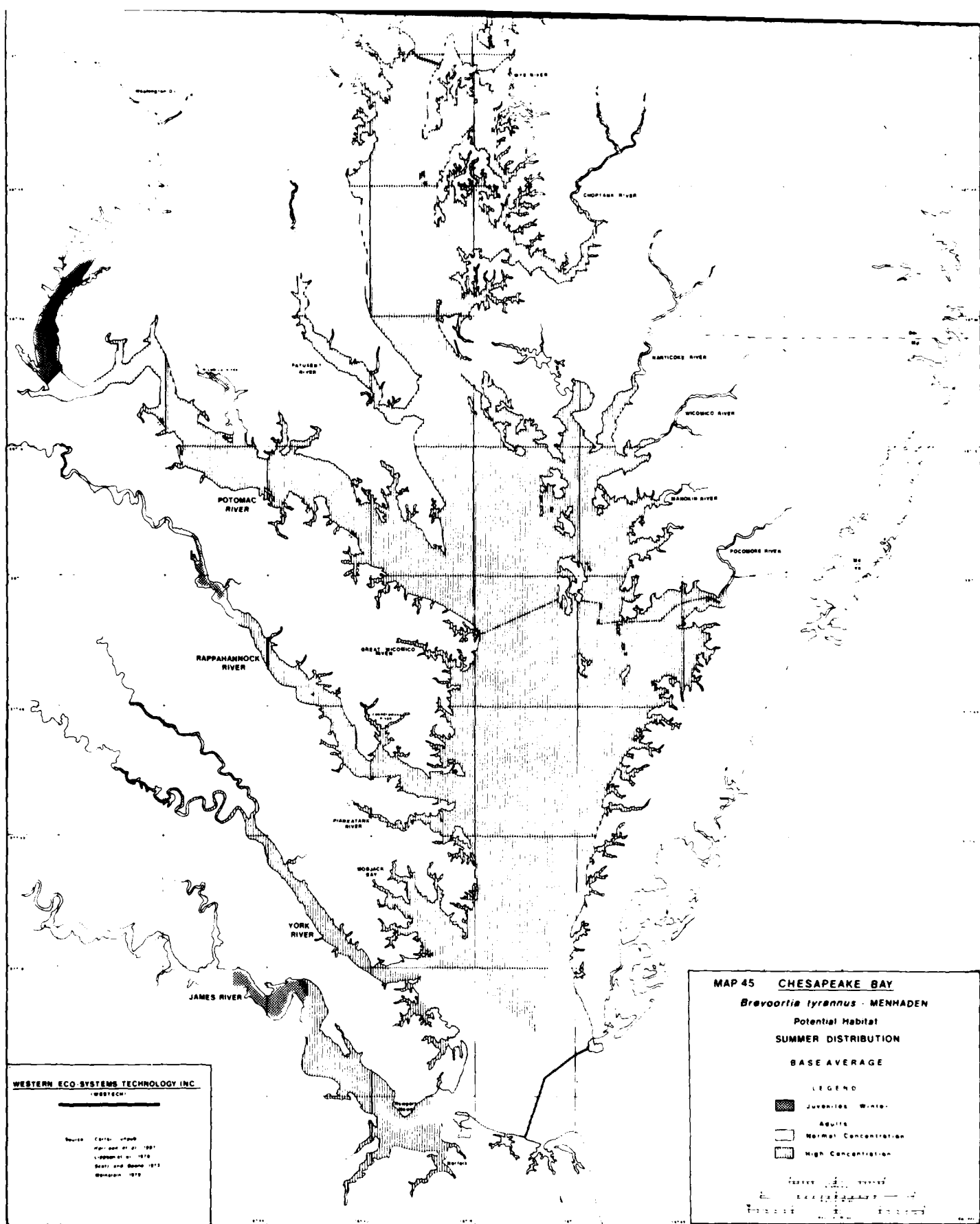


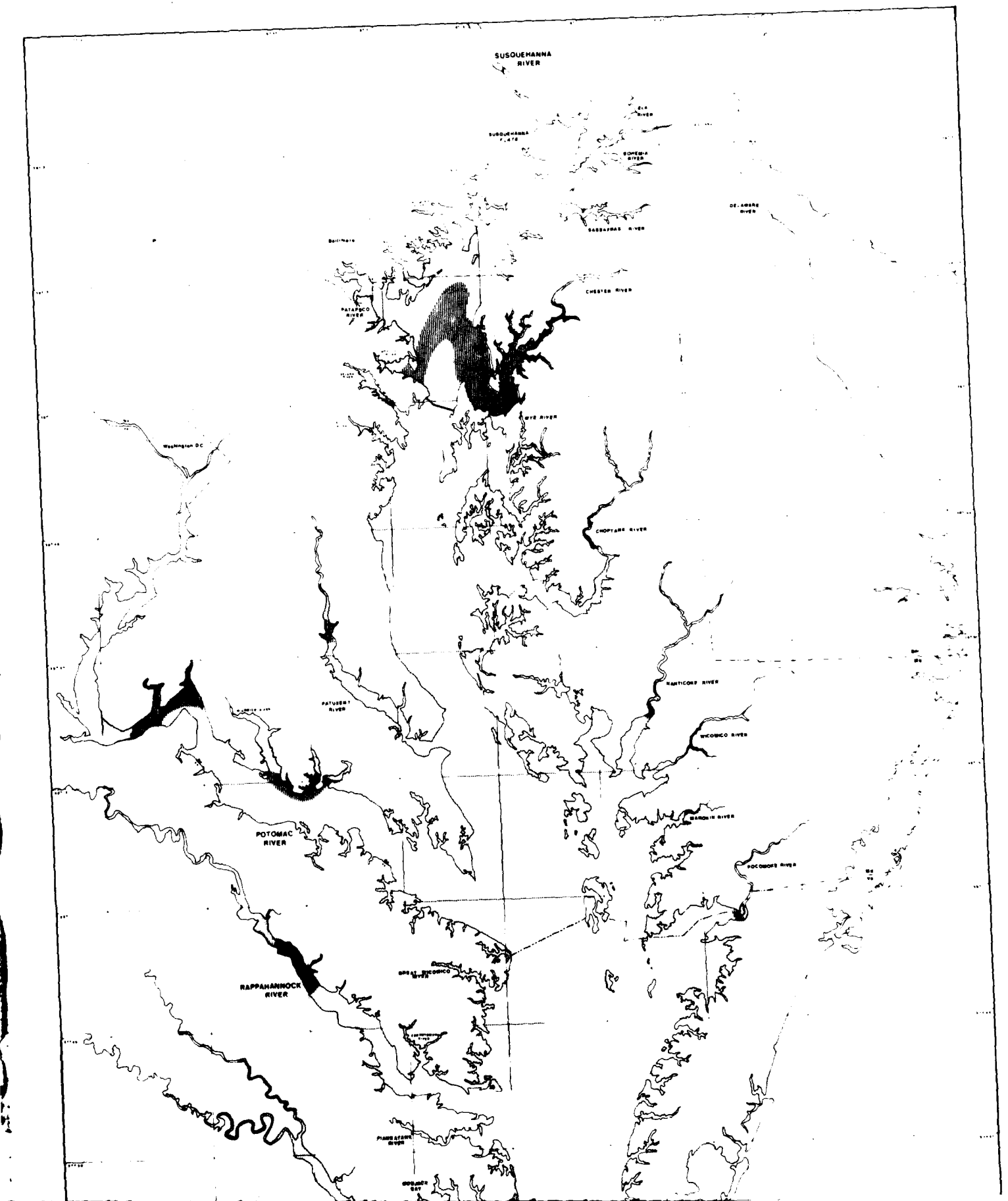


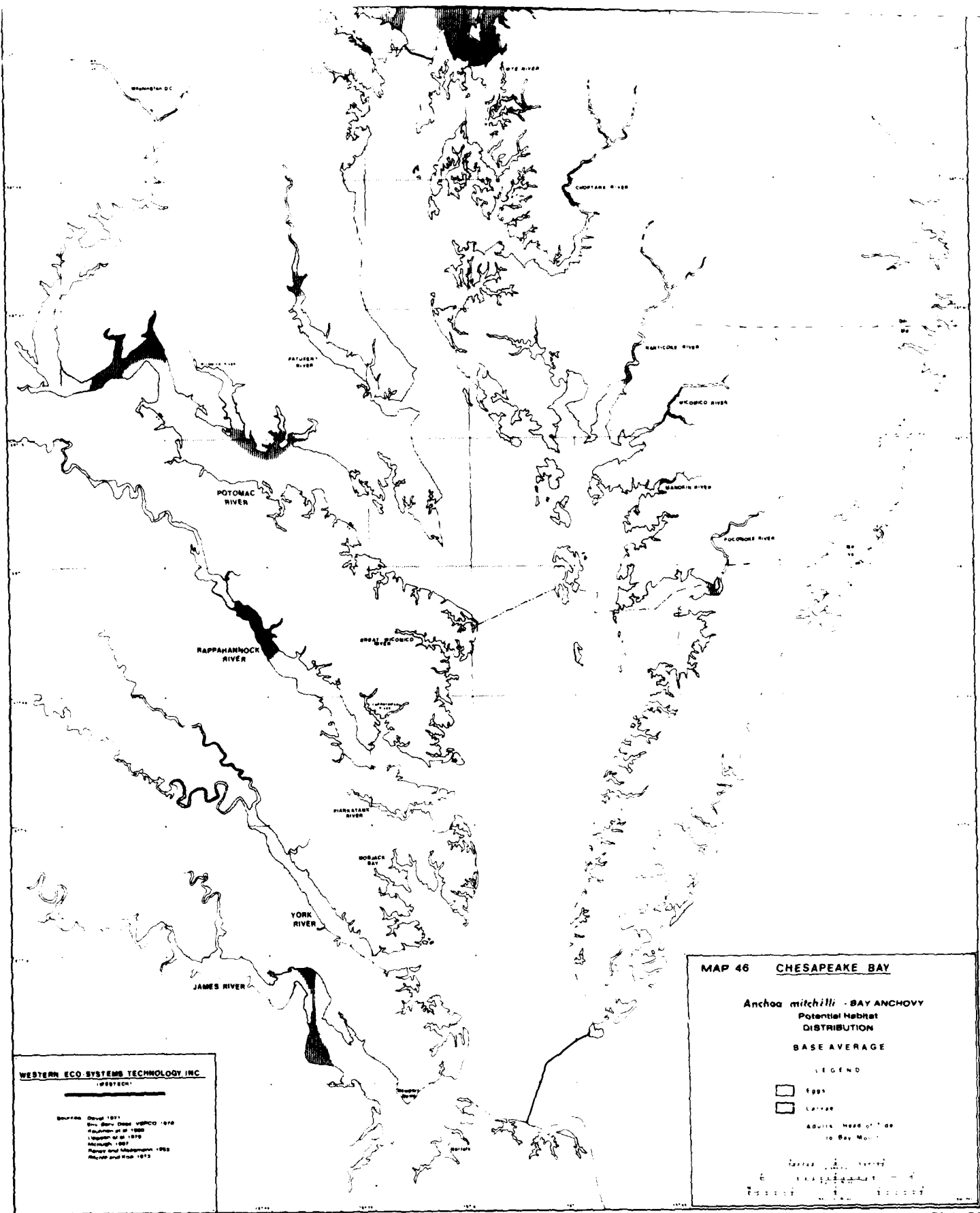


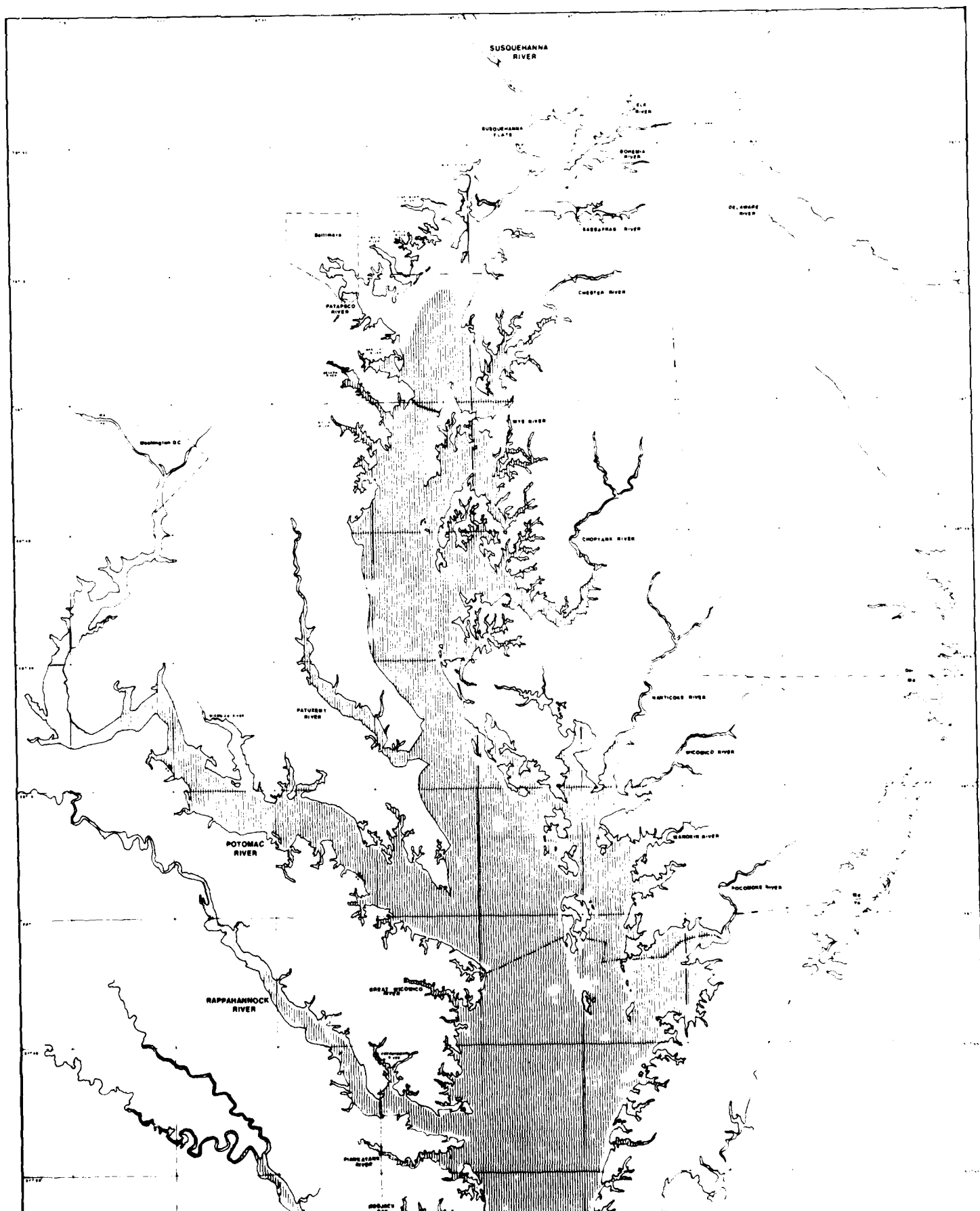


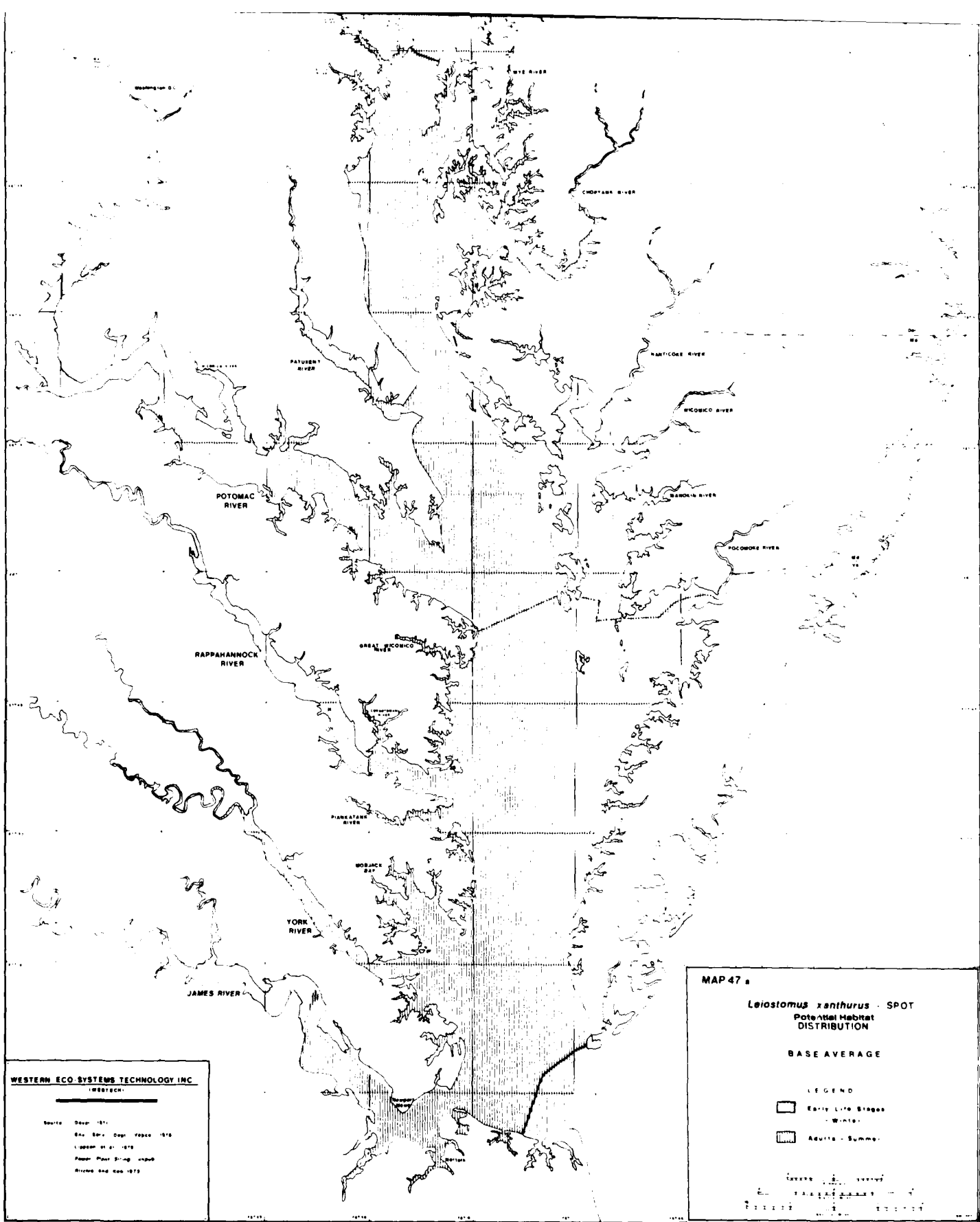


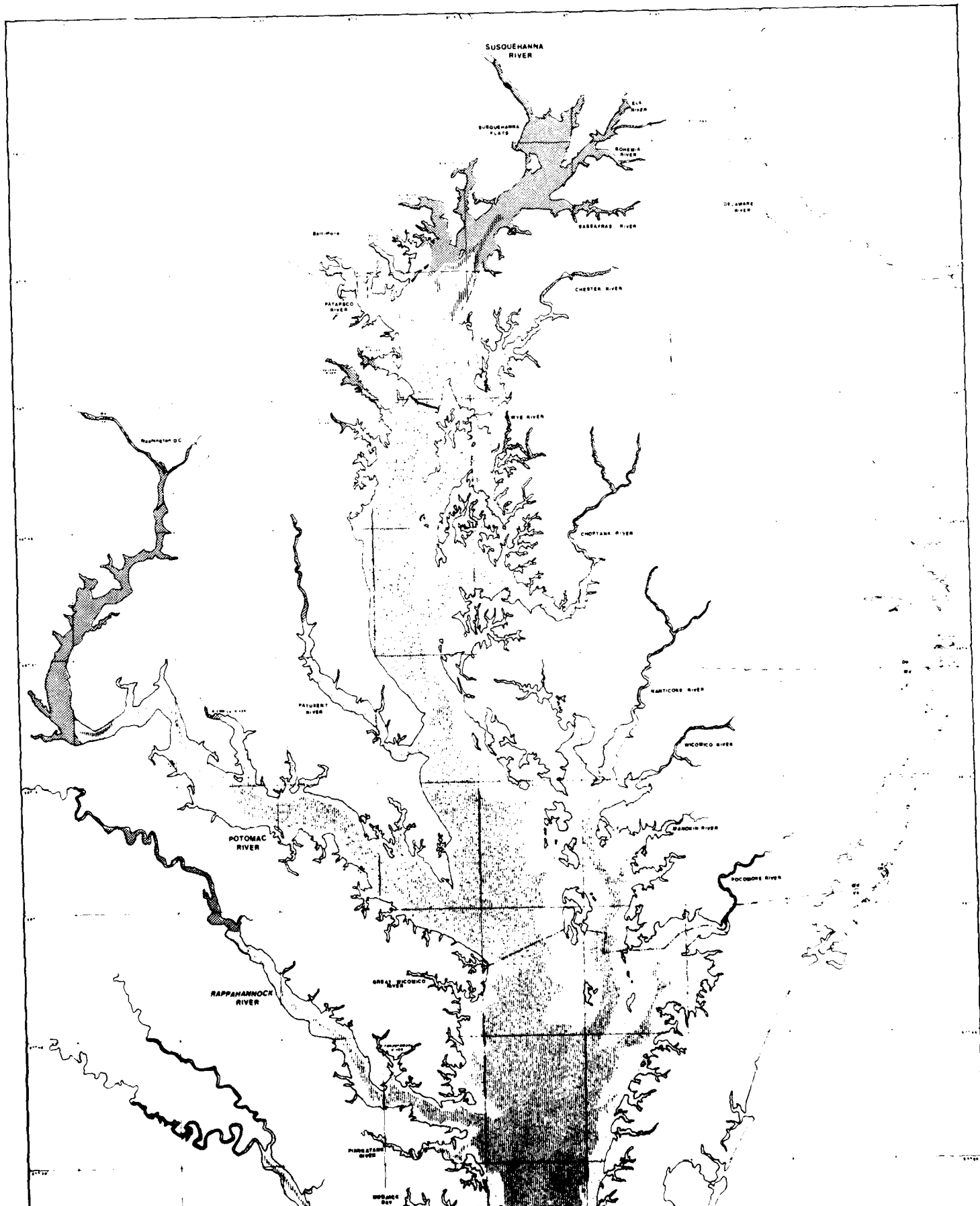


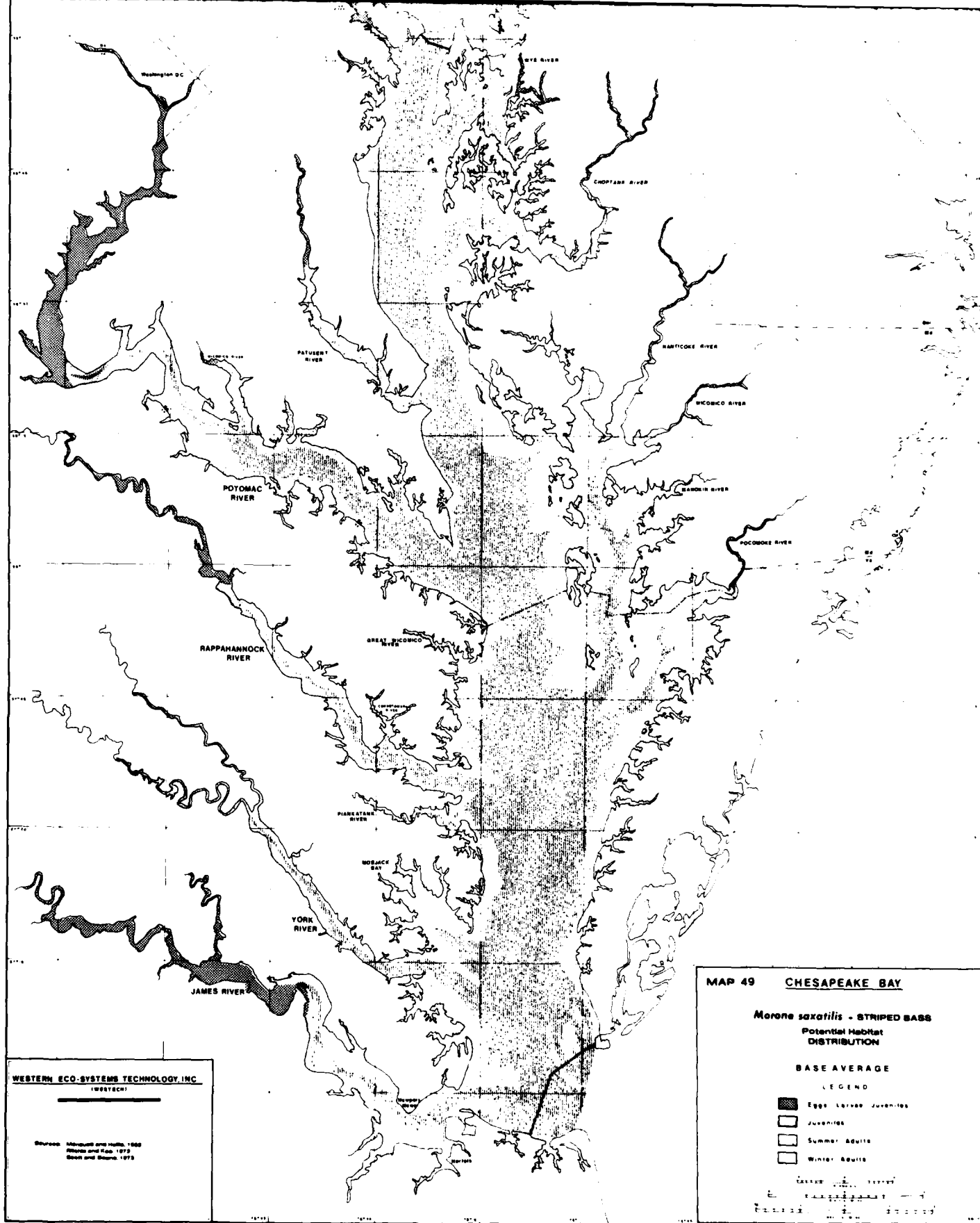




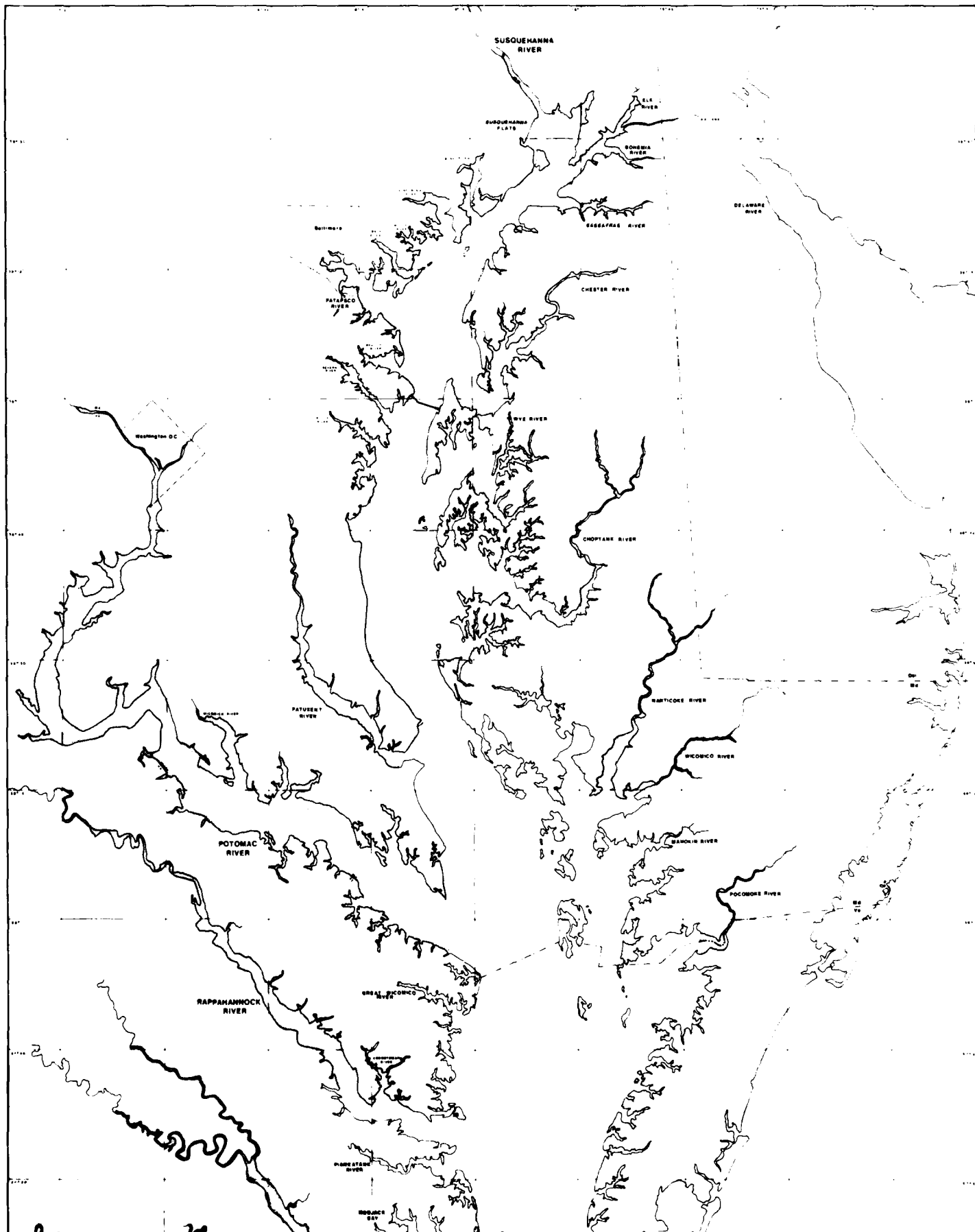


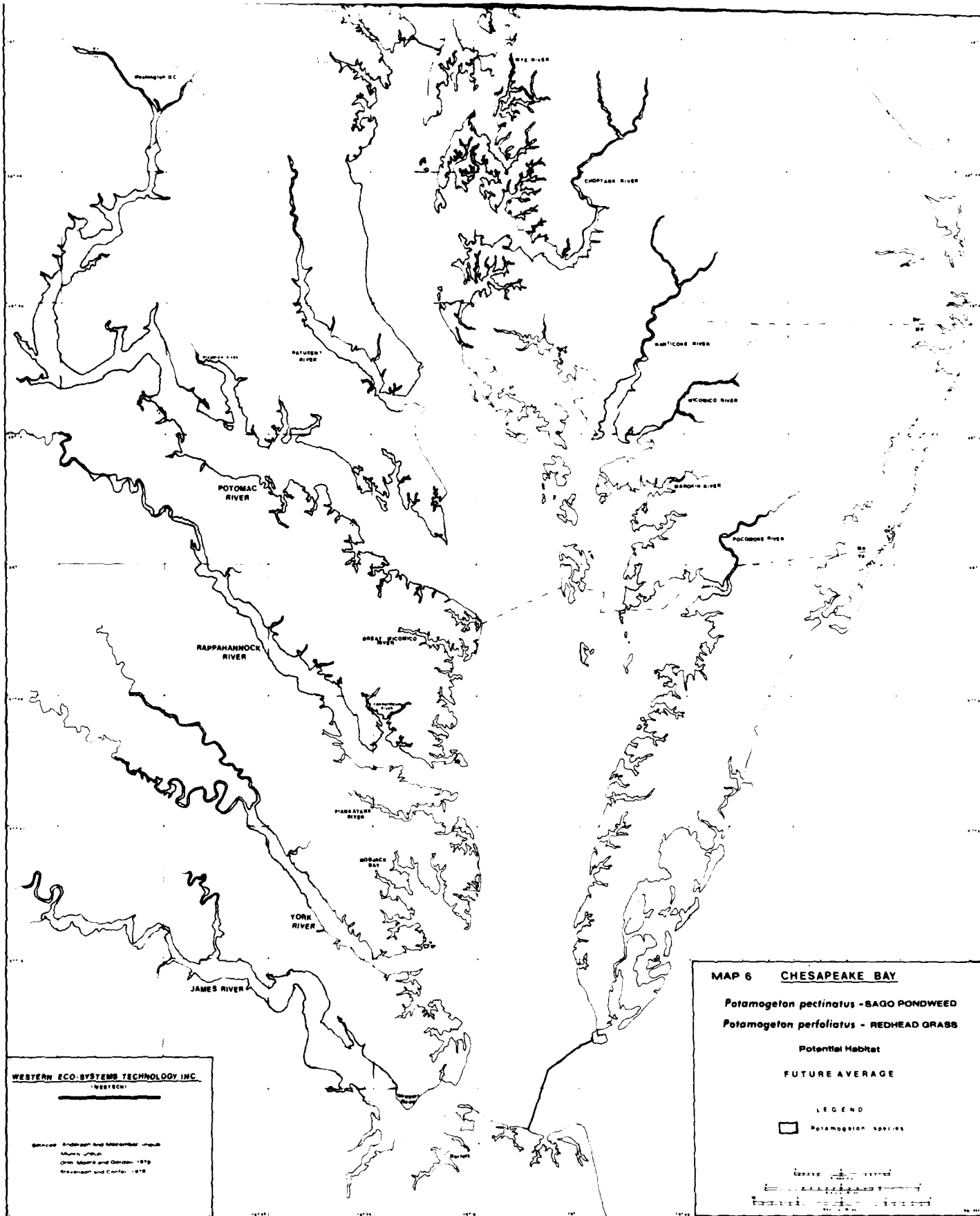


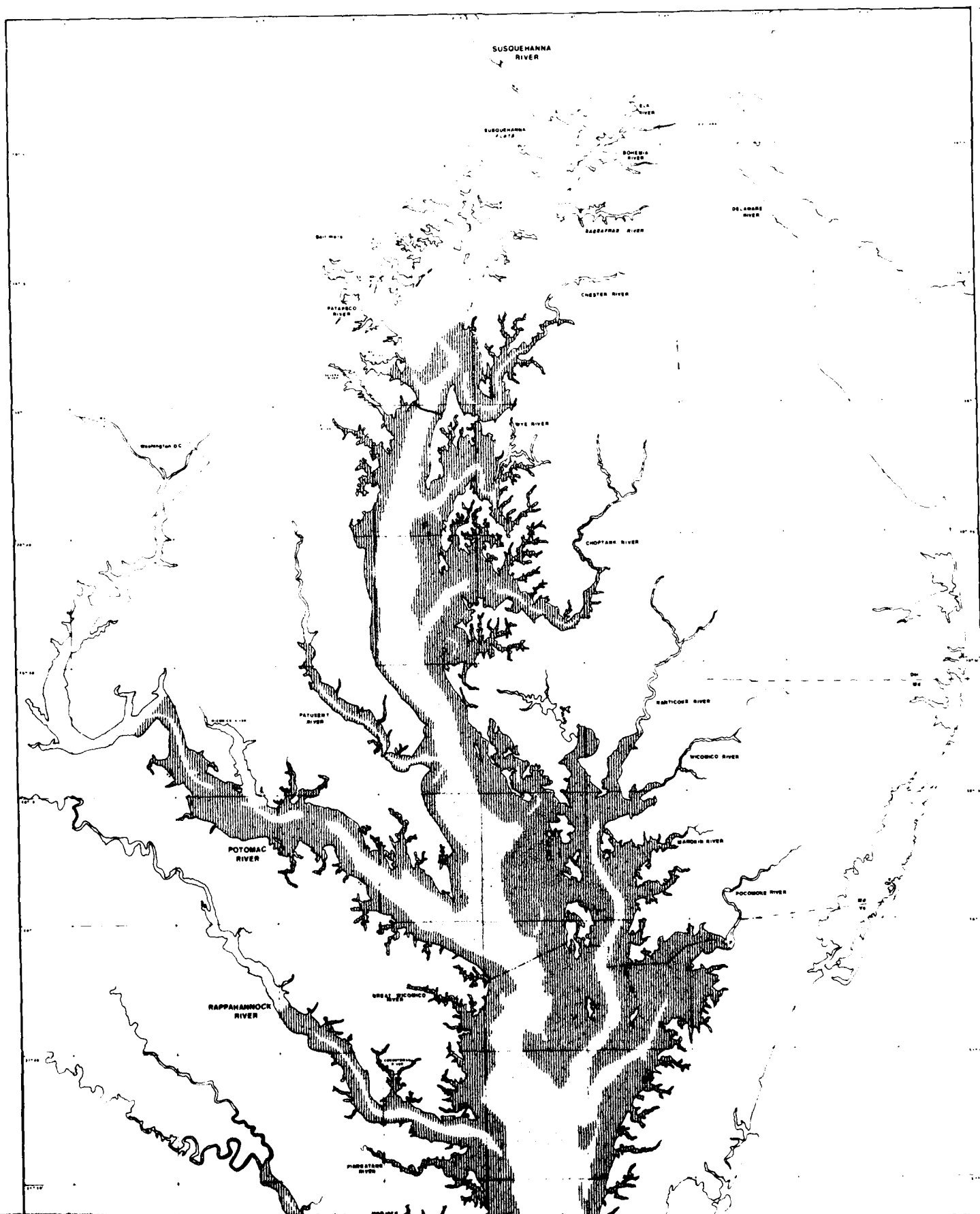


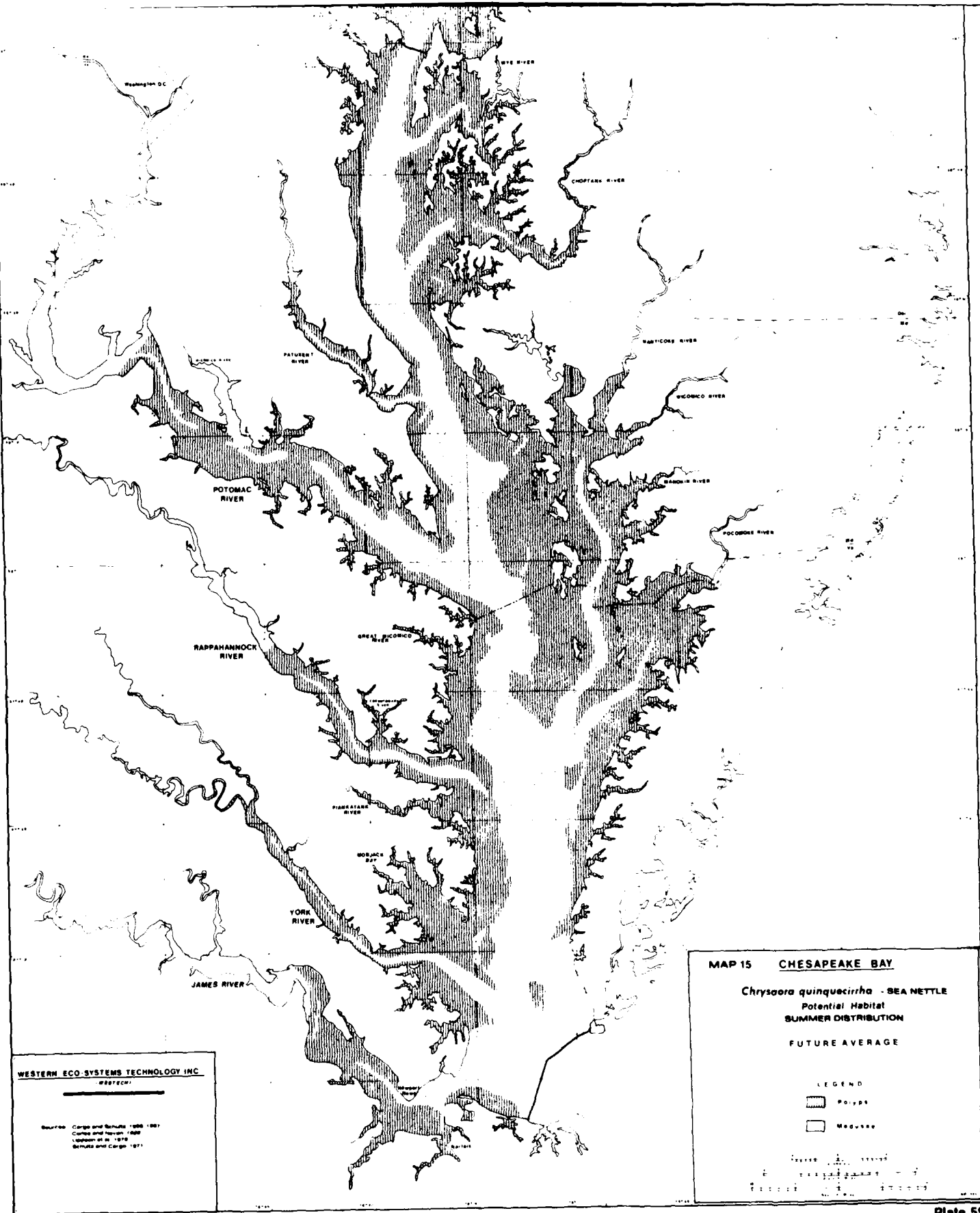


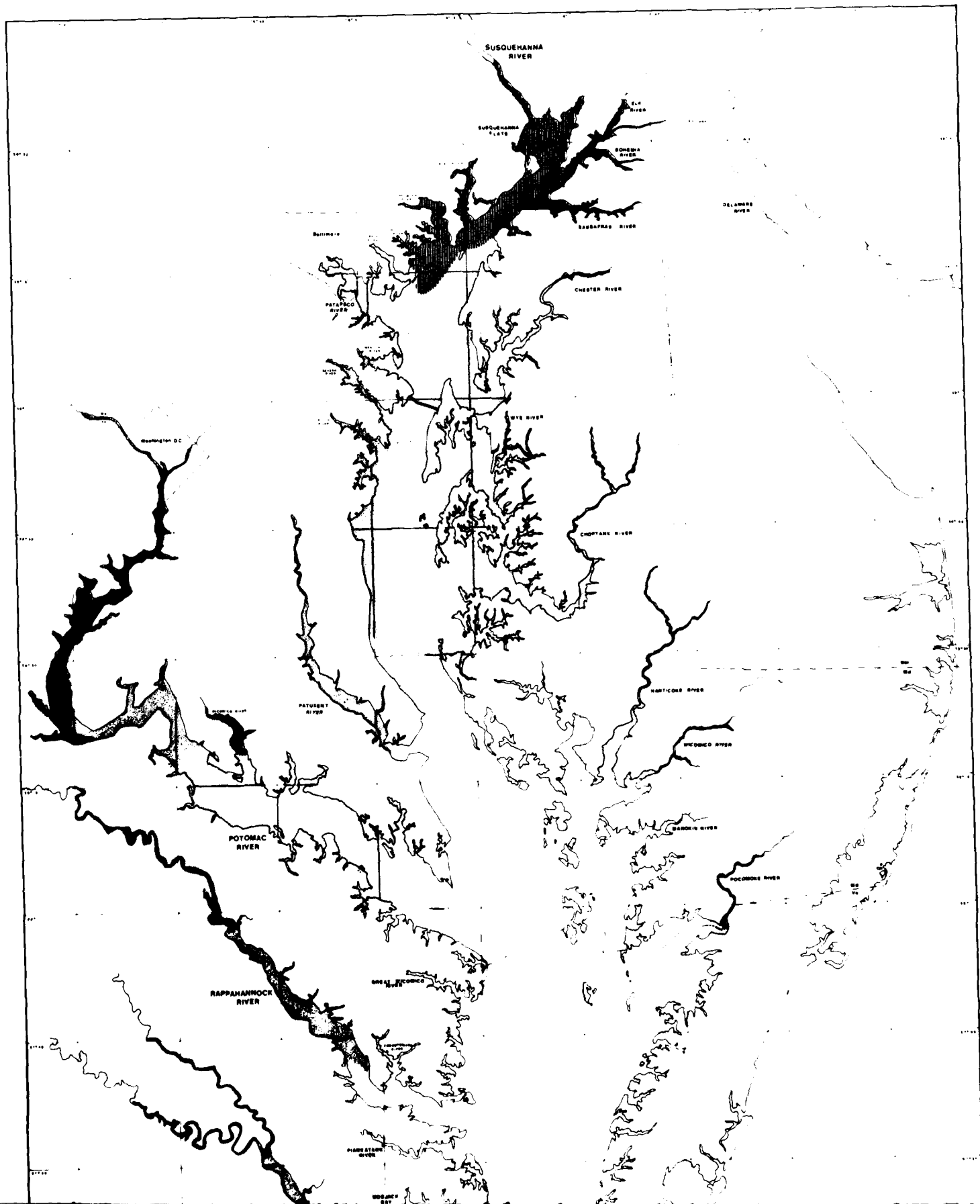


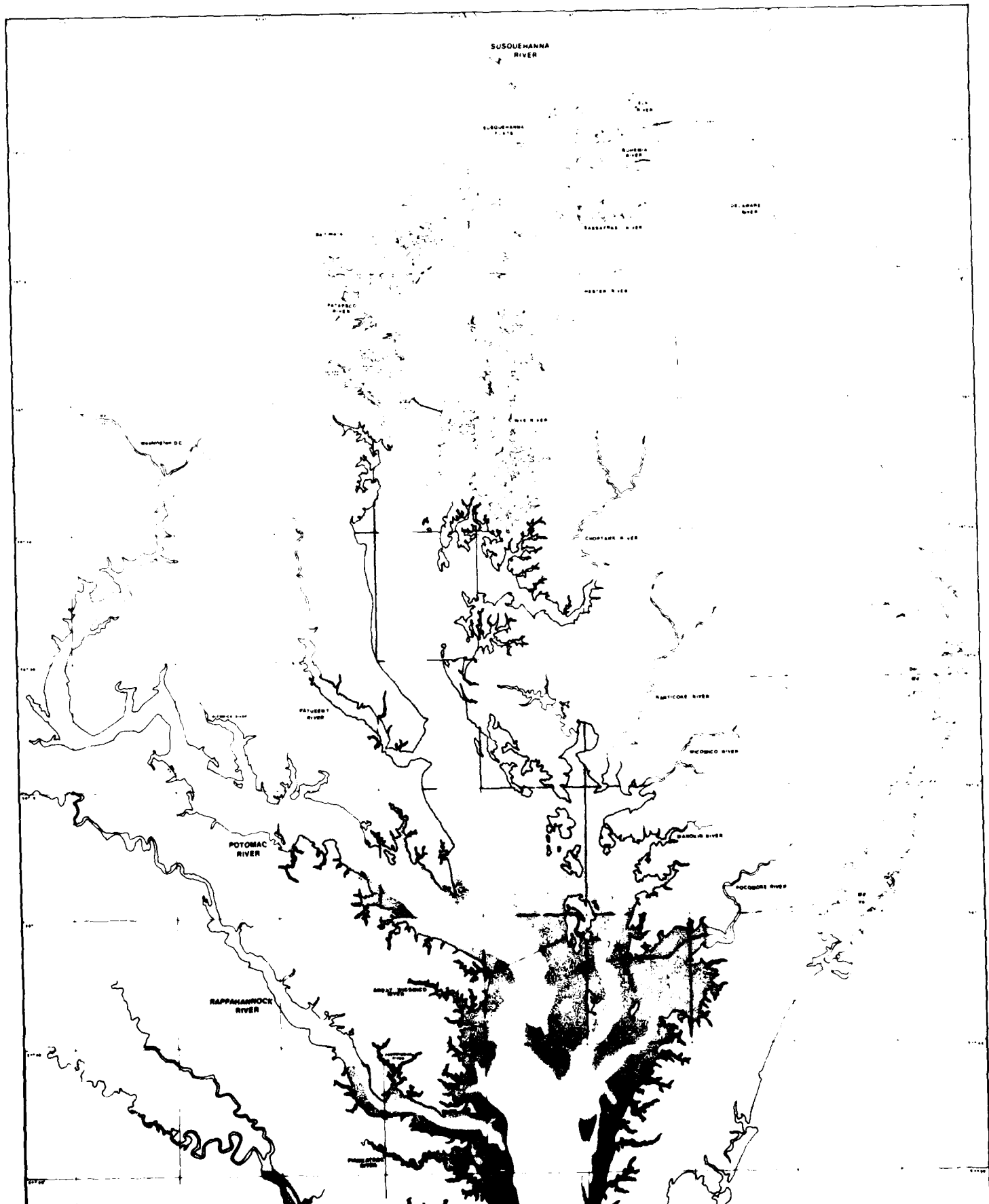




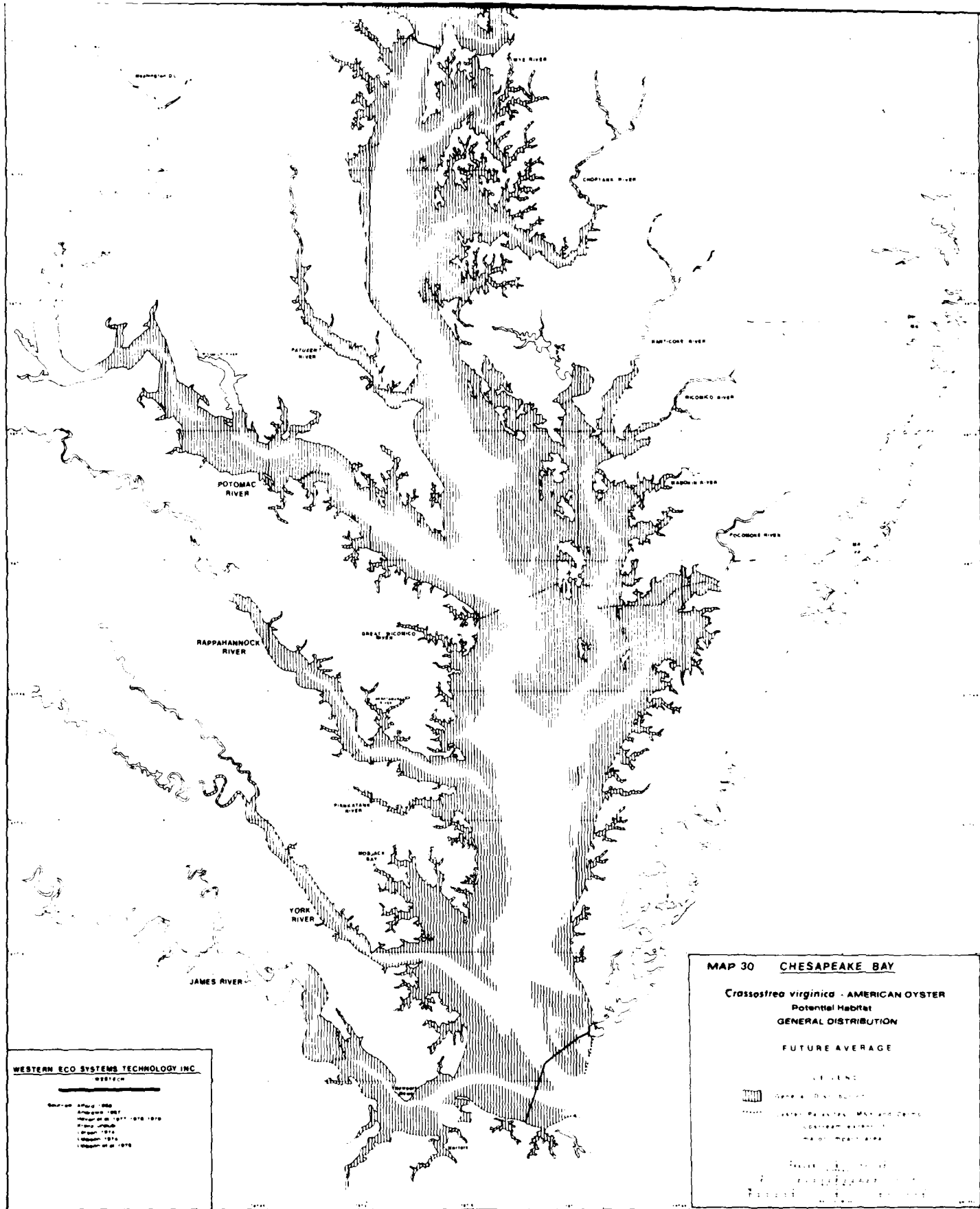












WESTERN ECO SYSTEMS TECHNOLOGY INC.
WESTON, OHIO

Source: A. J. J. 1988
A. J. J. 1987
Map of the 1977-1978 1978
A. J. J. 1978
A. J. J. 1978
A. J. J. 1978
A. J. J. 1978

MAP 30 CHESAPEAKE BAY

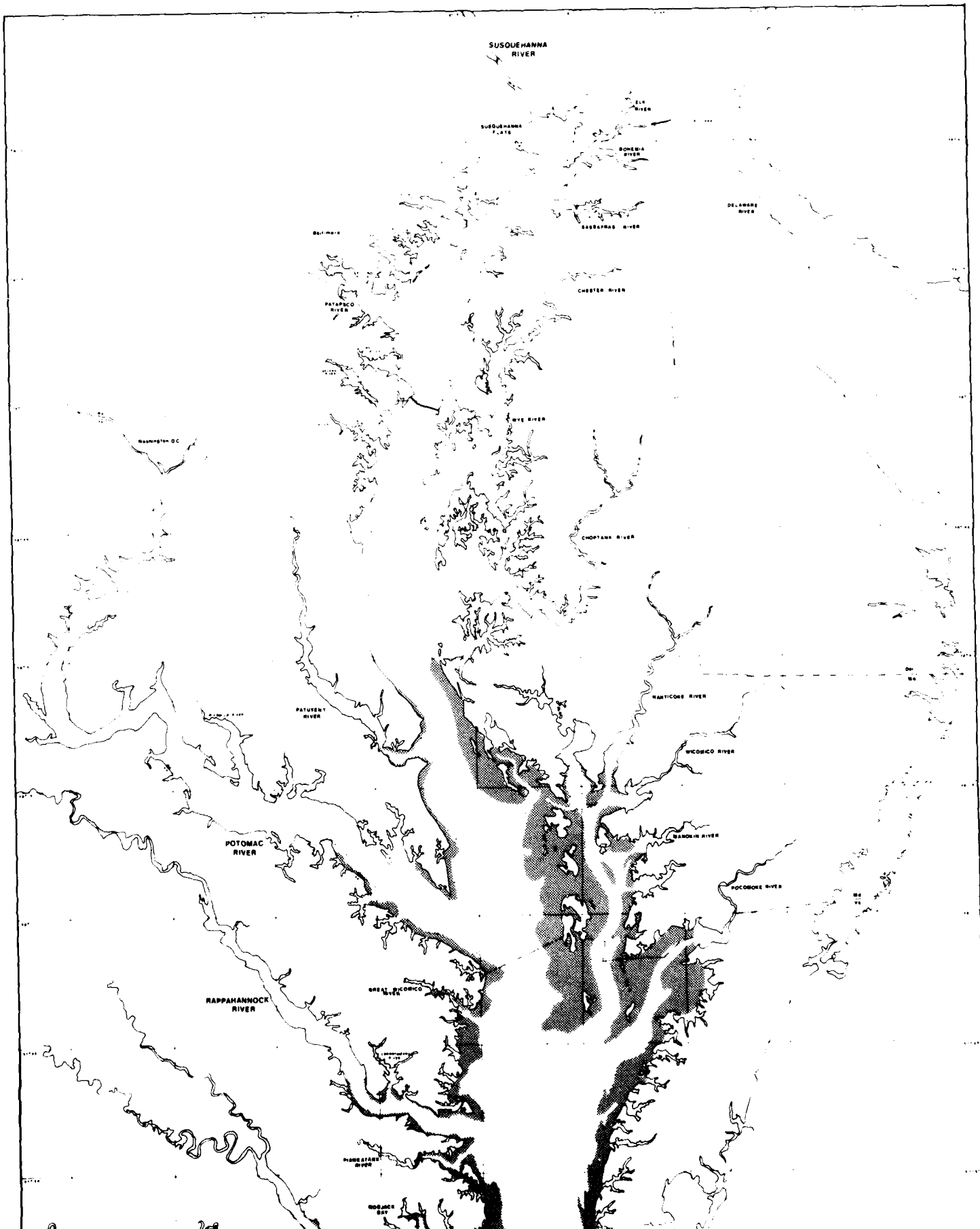
Crassostrea virginica - AMERICAN OYSTER
Potential Habitat
GENERAL DISTRIBUTION
FUTURE AVERAGE

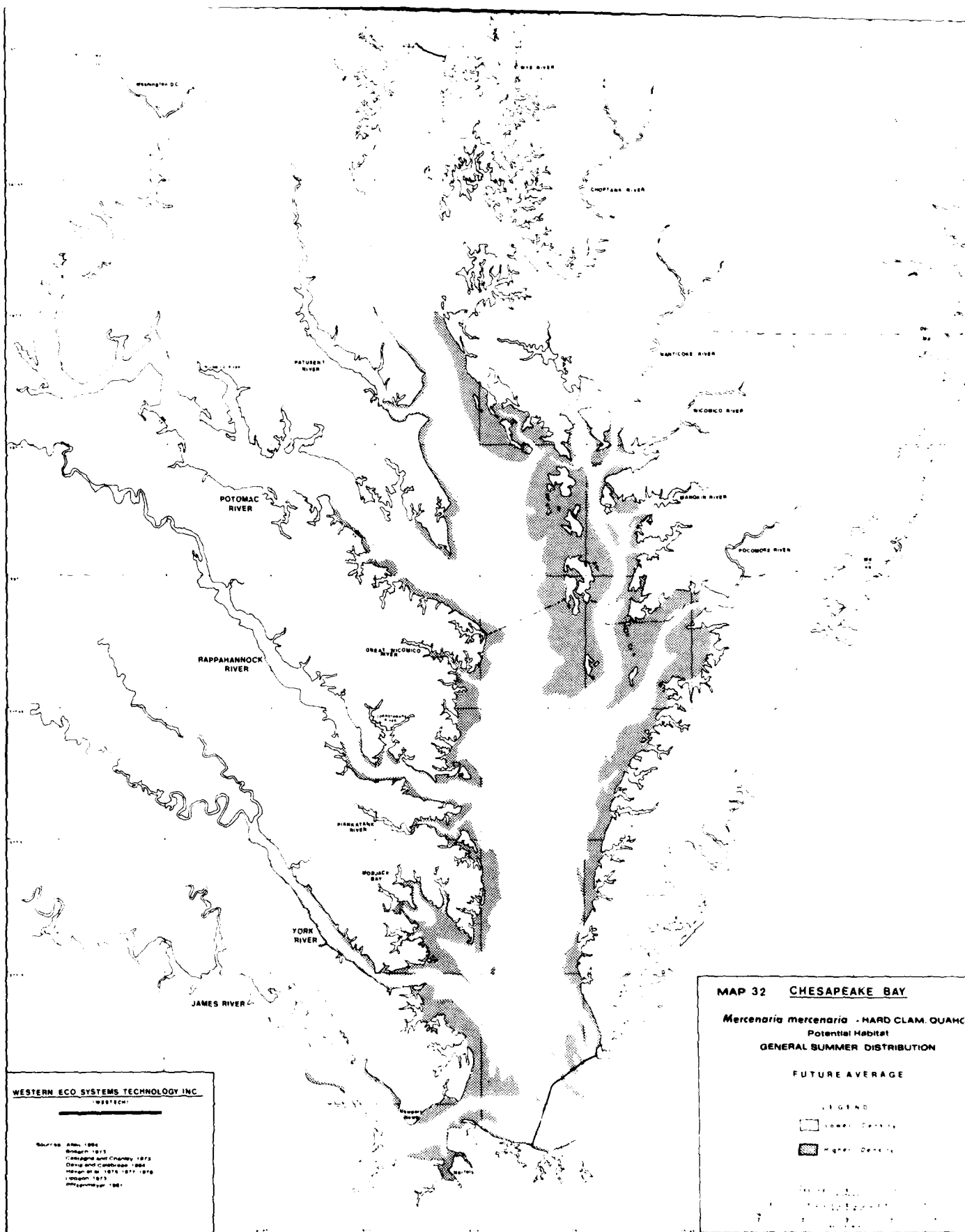
LEGEND

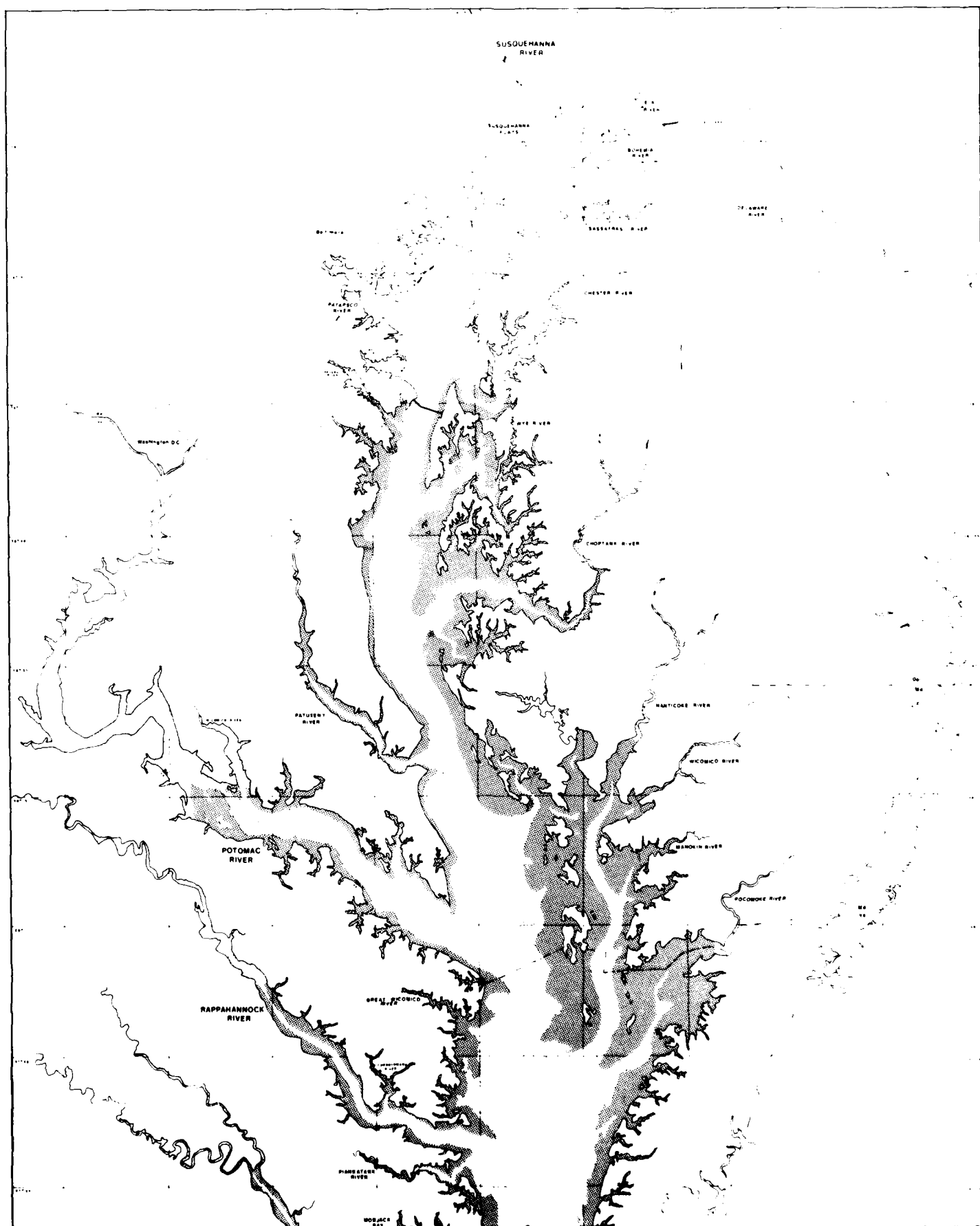
Shaded Area: Potential Habitat
Dashed Line: Major Tributaries
Solid Line: Major Tributaries
Dotted Line: Major Tributaries

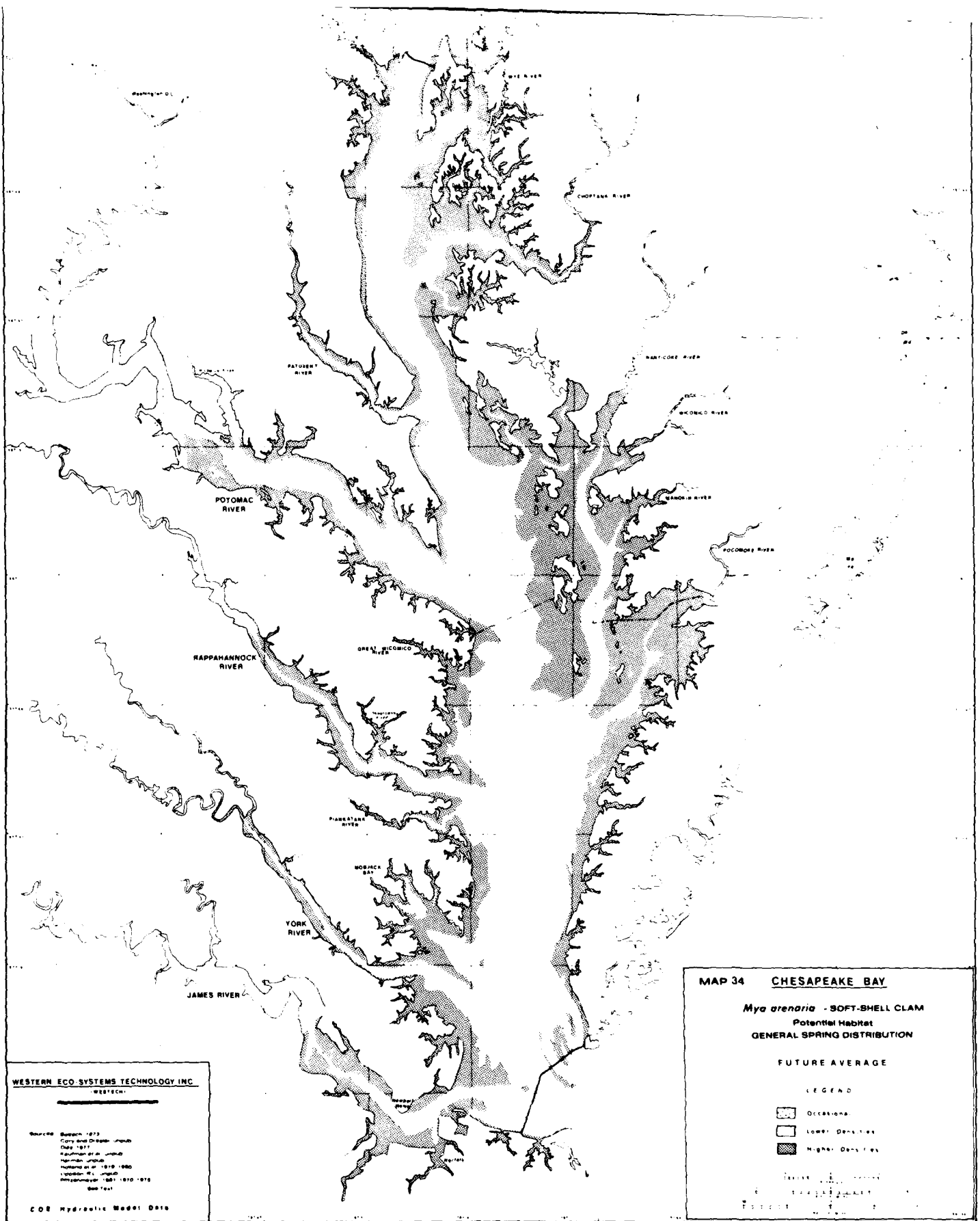
Scale: 1:100,000
North Arrow

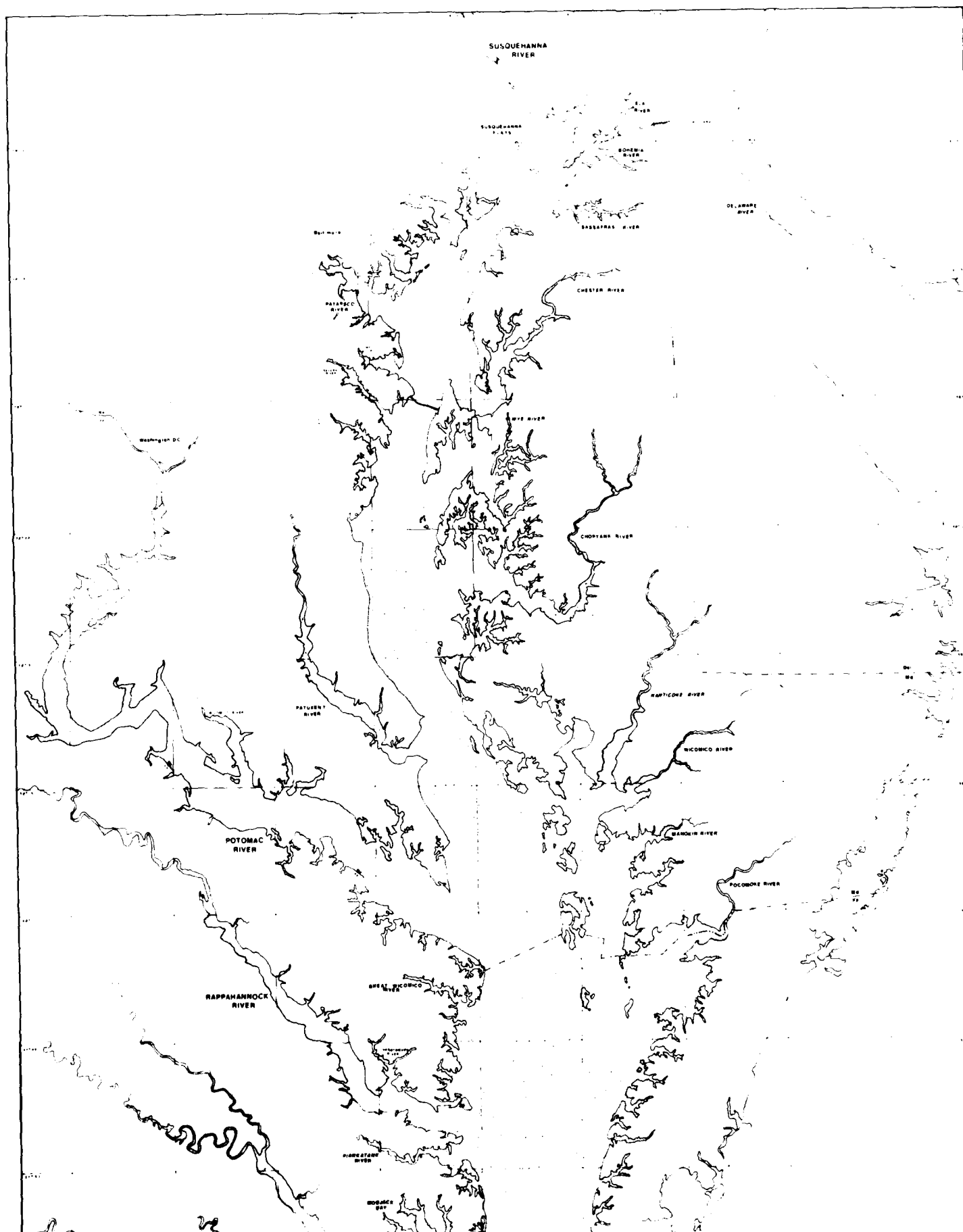


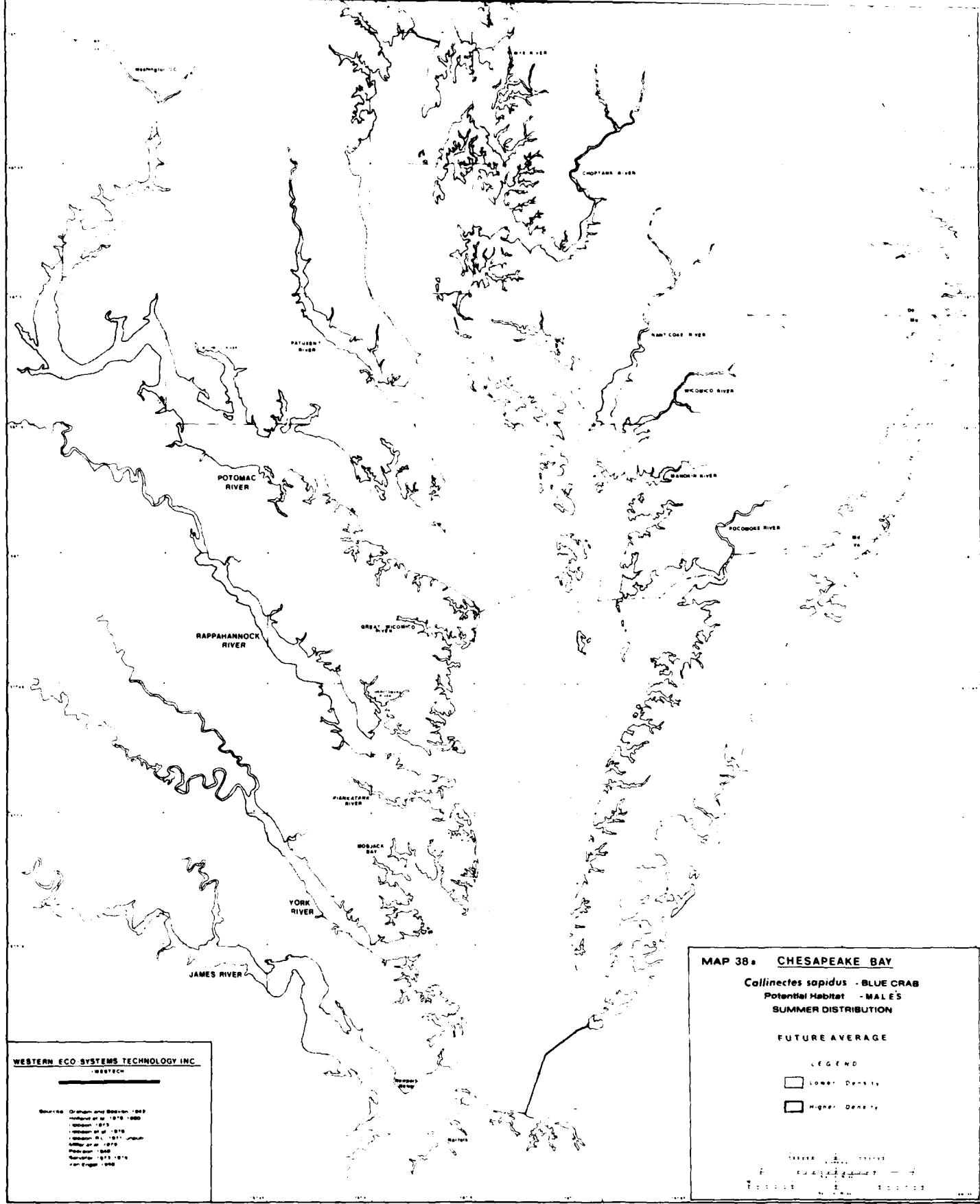


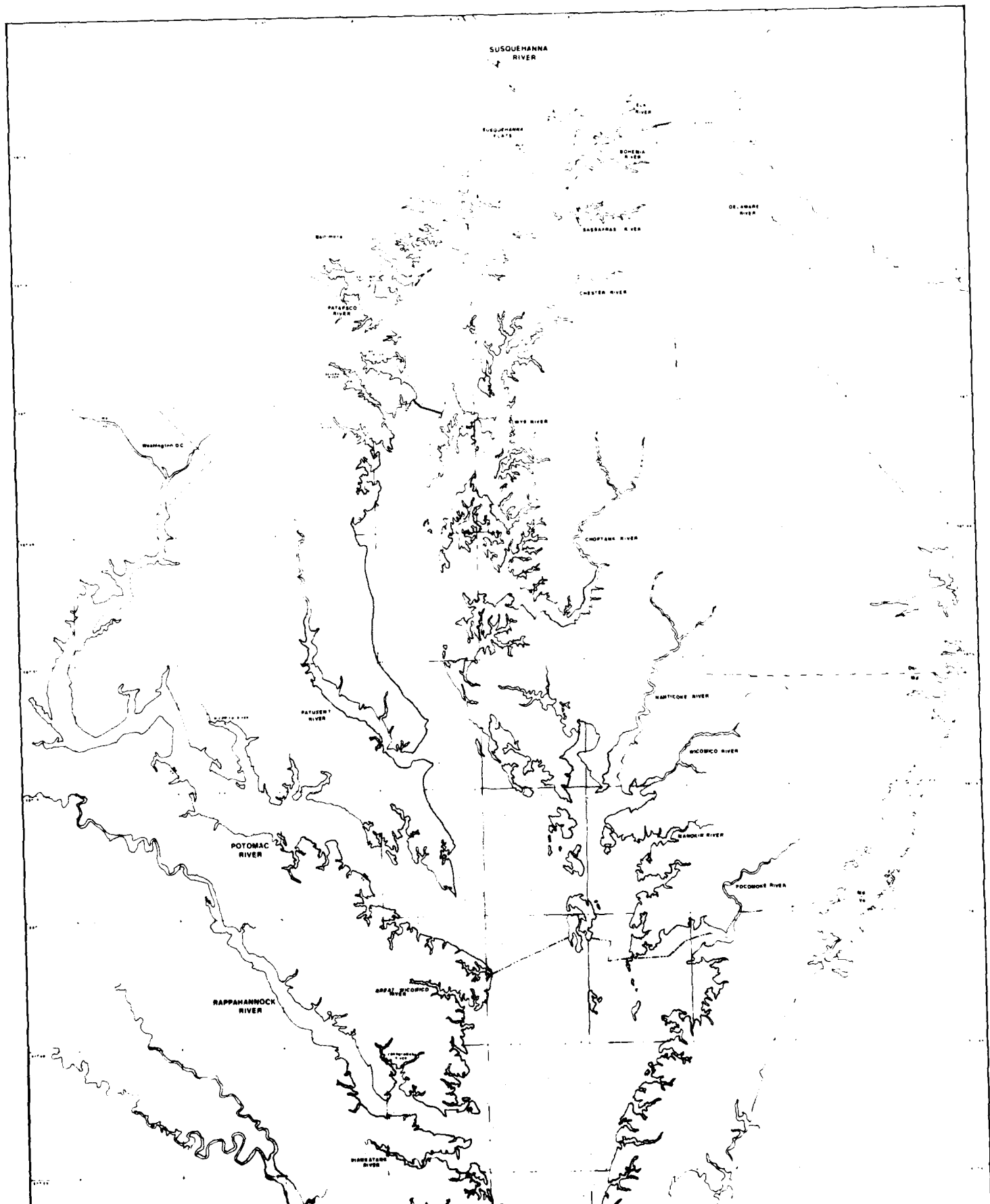


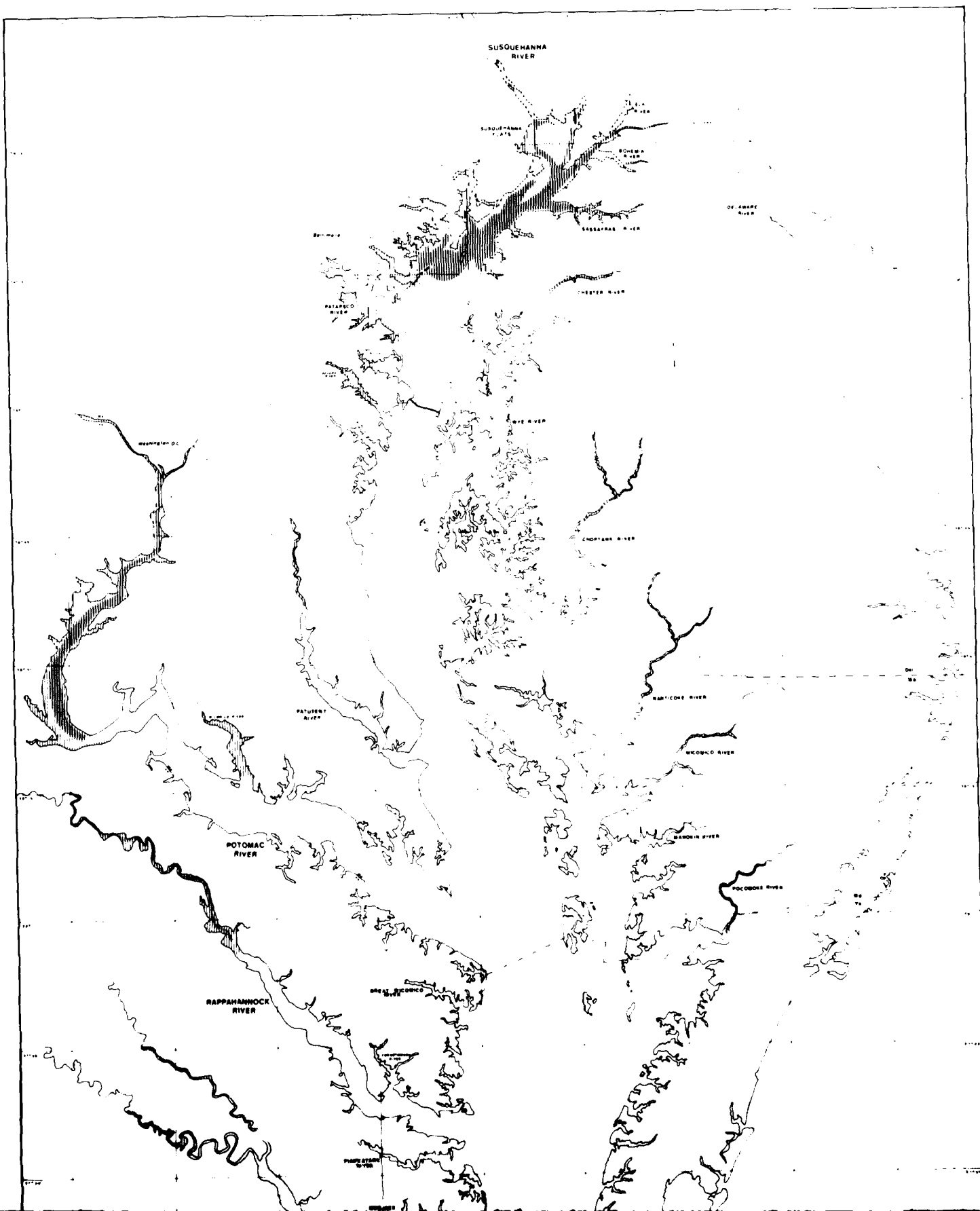


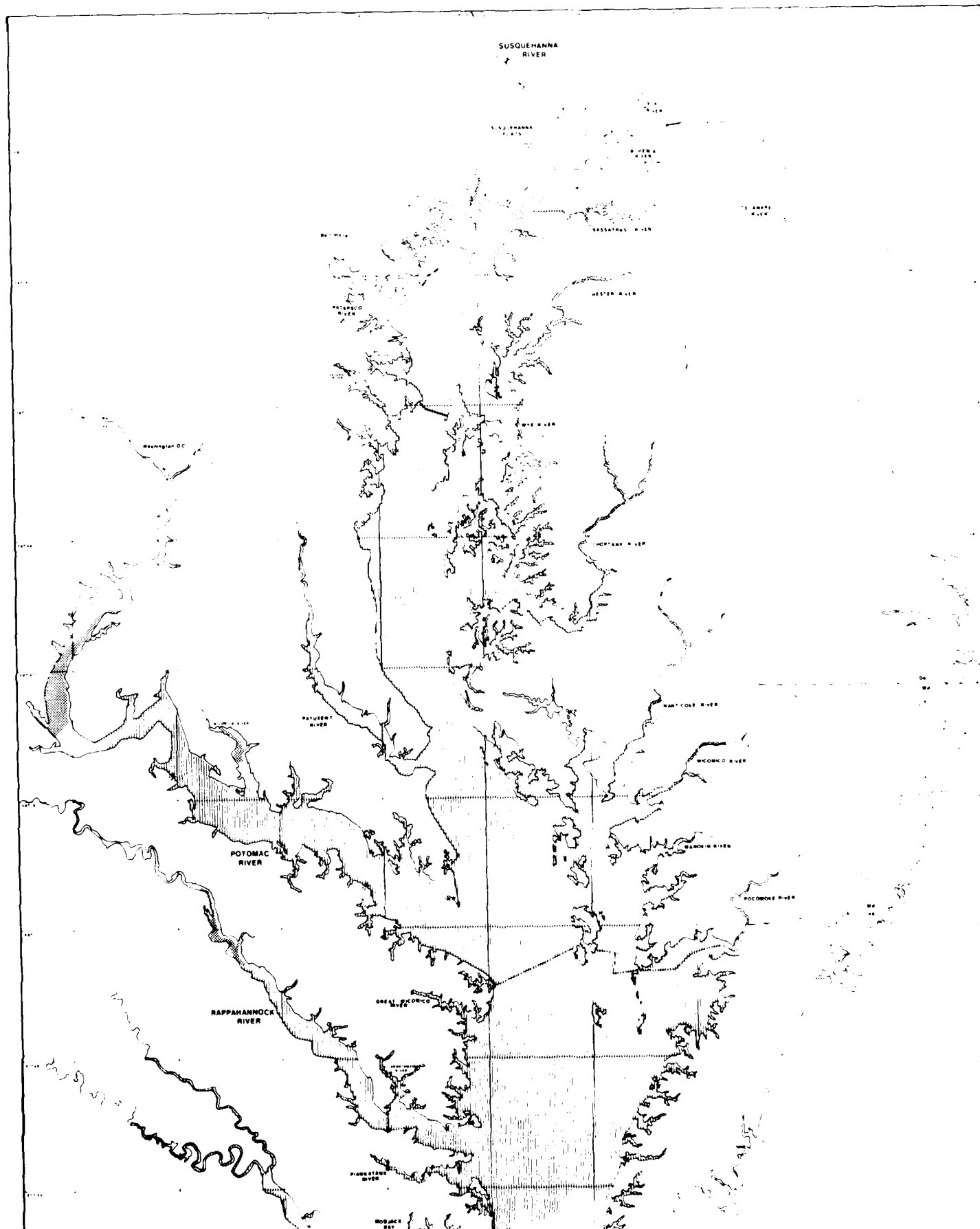


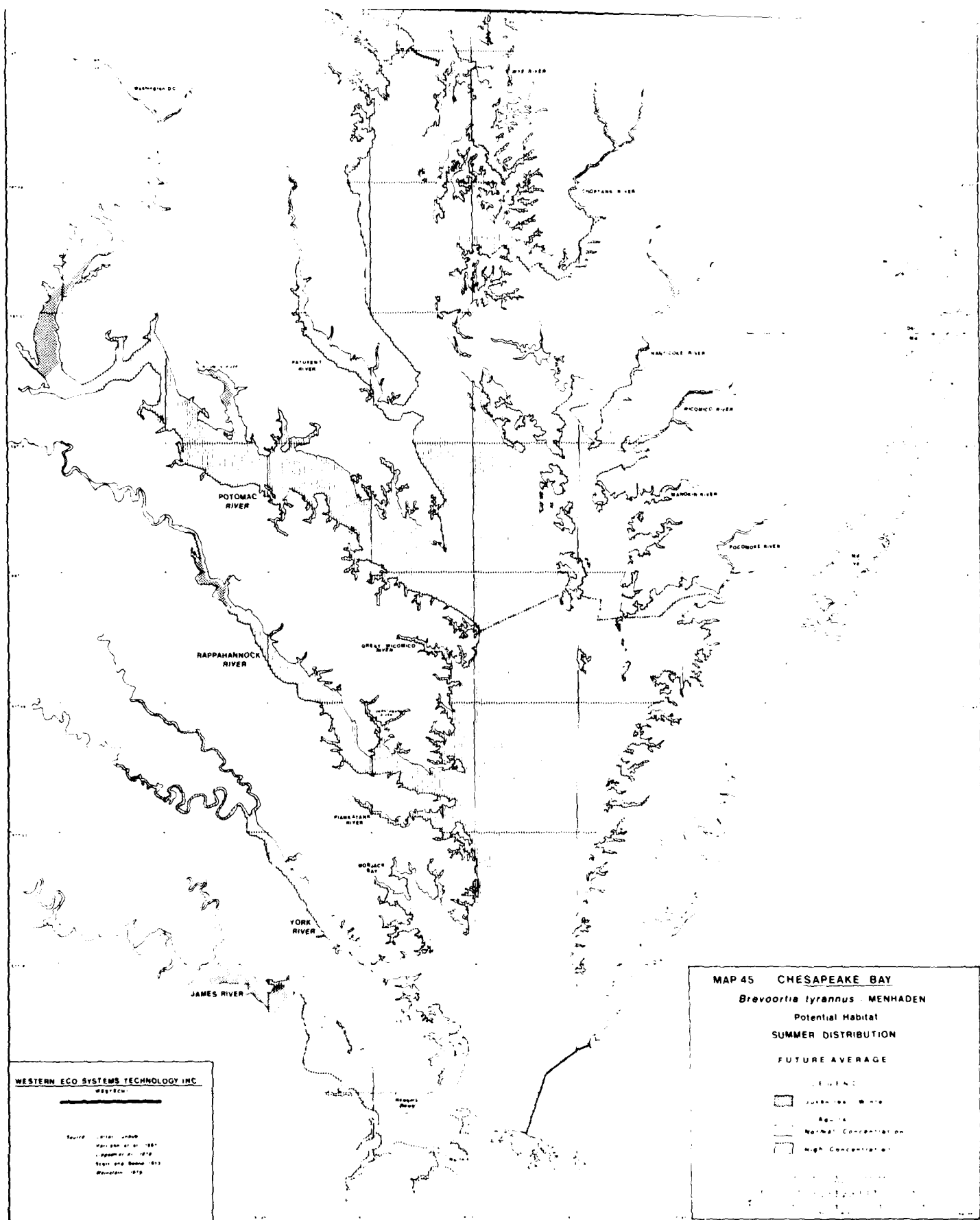




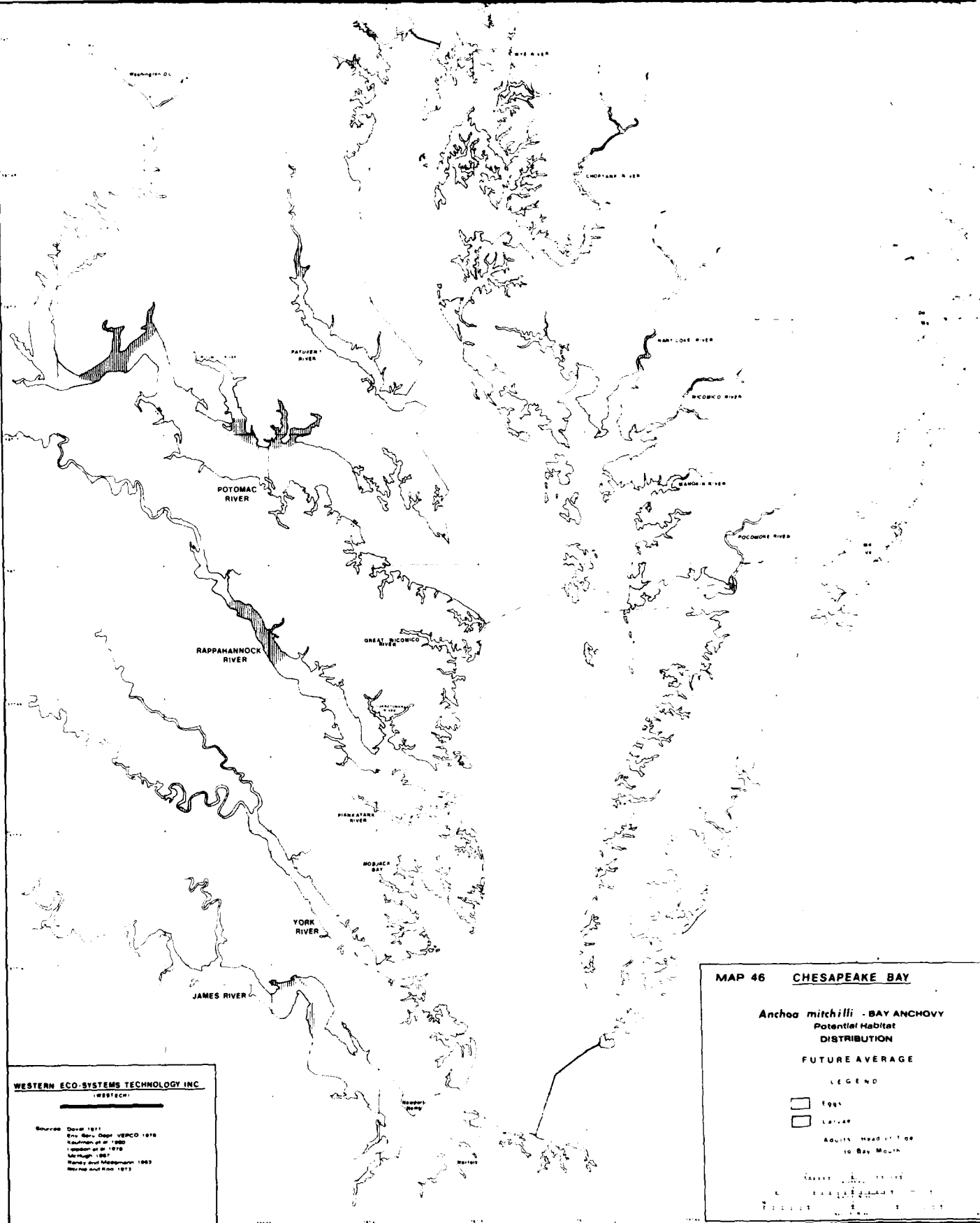


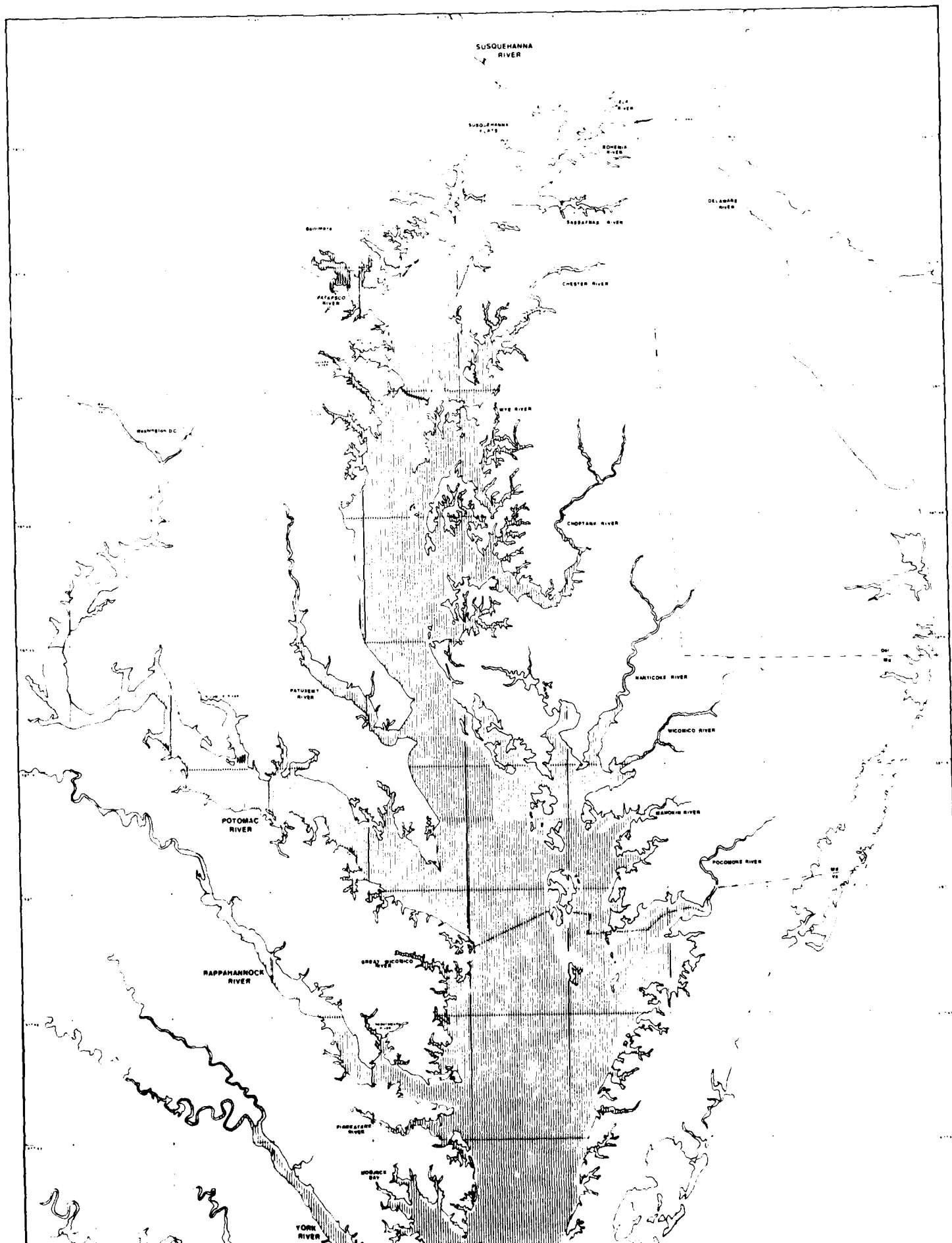


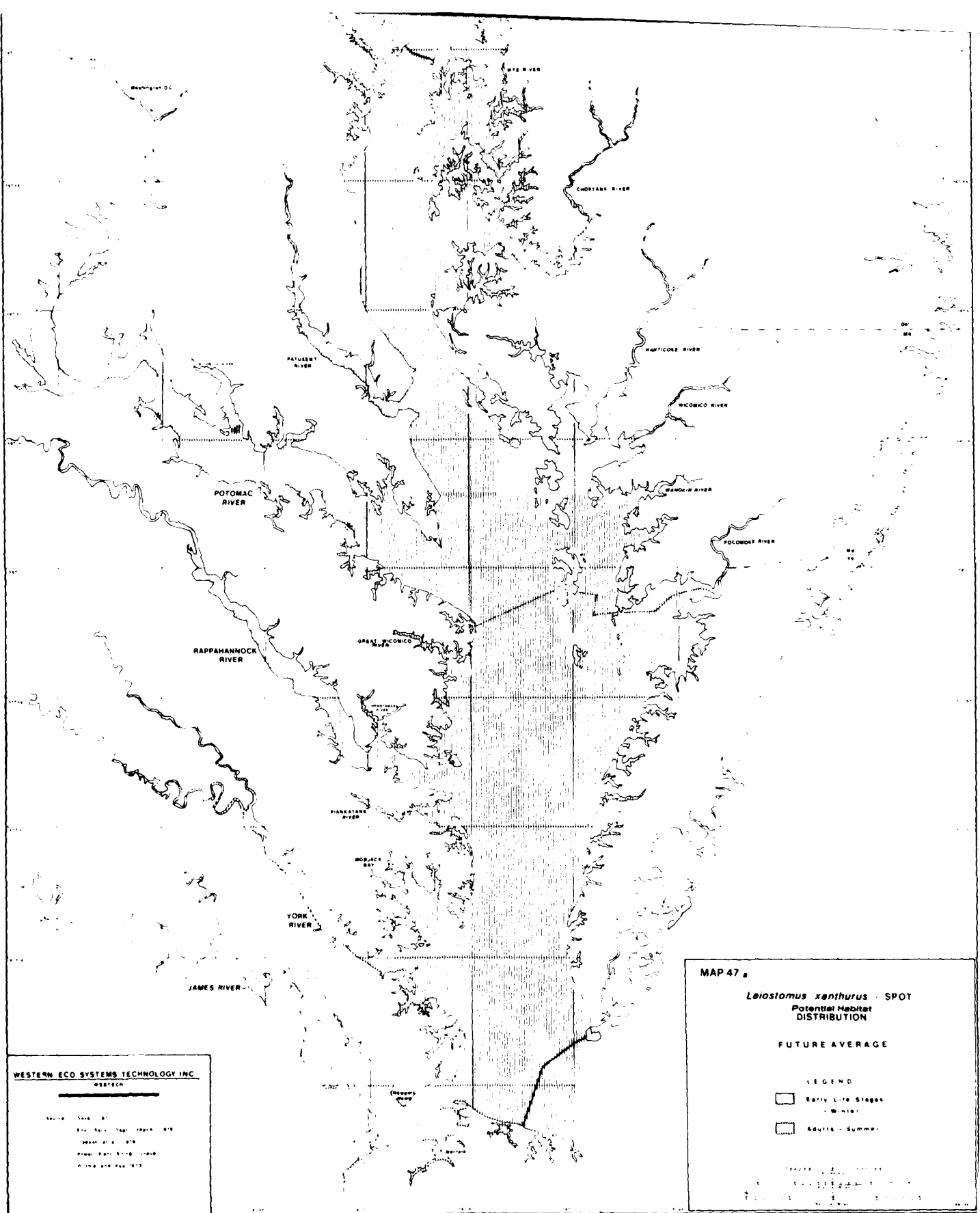


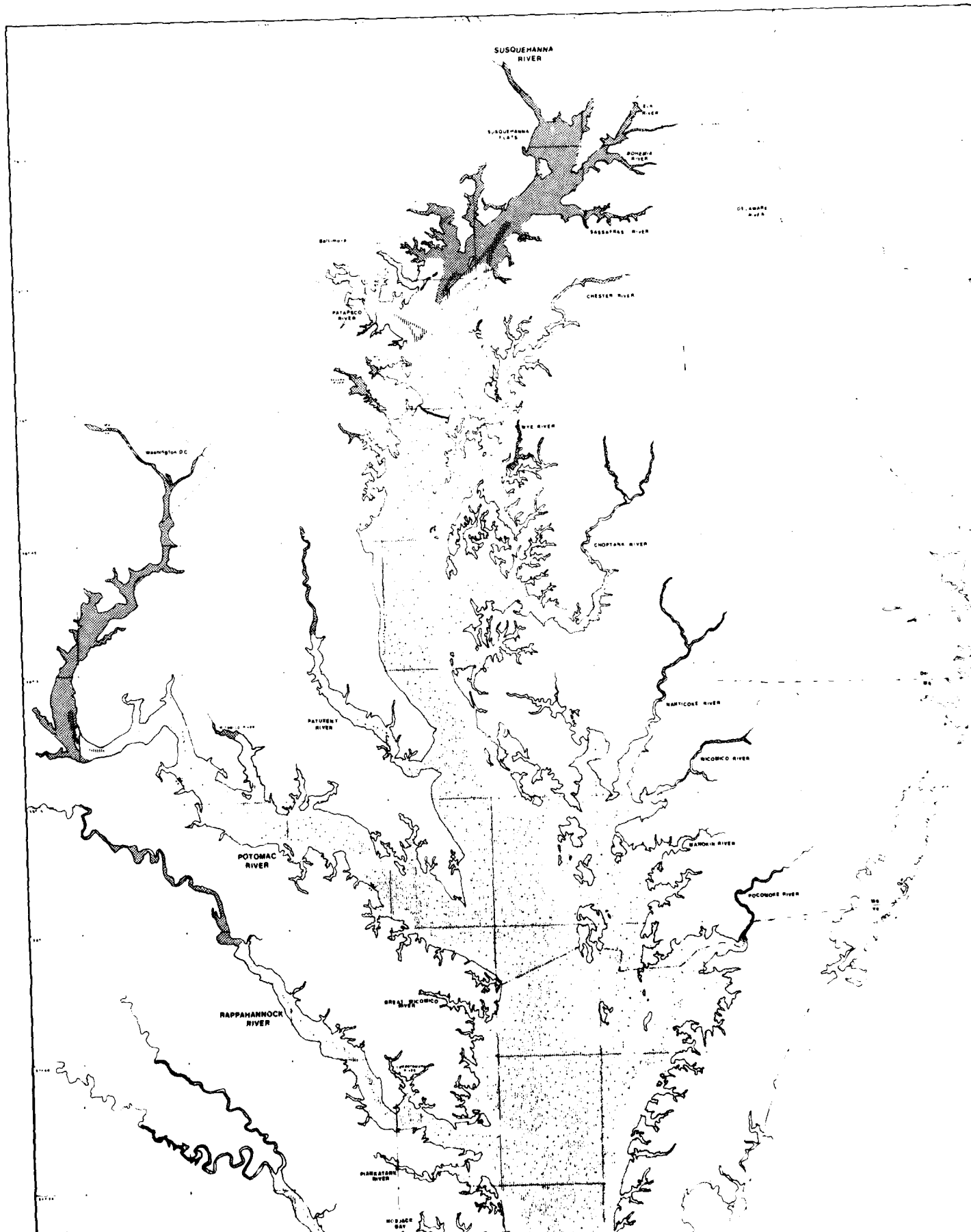


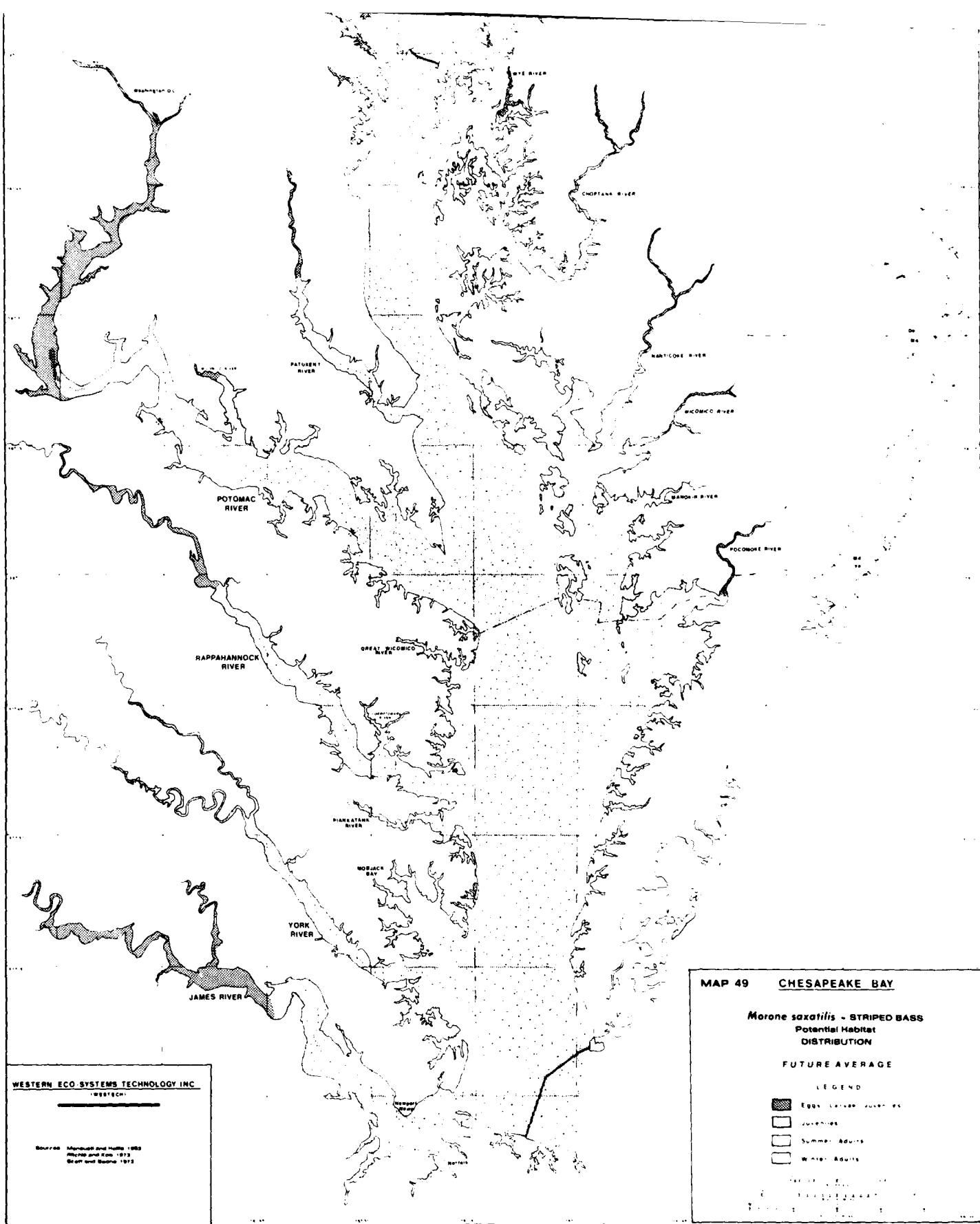




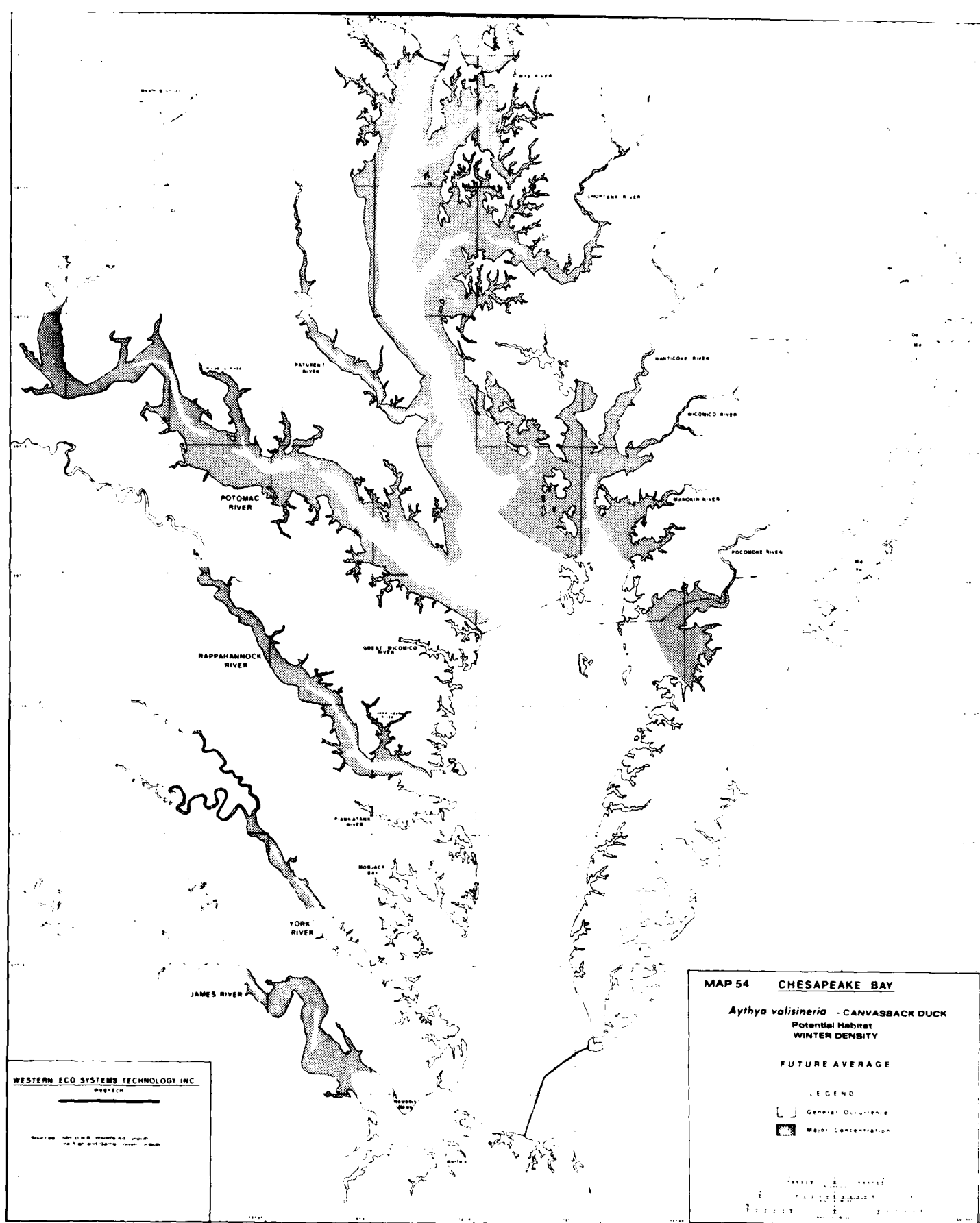


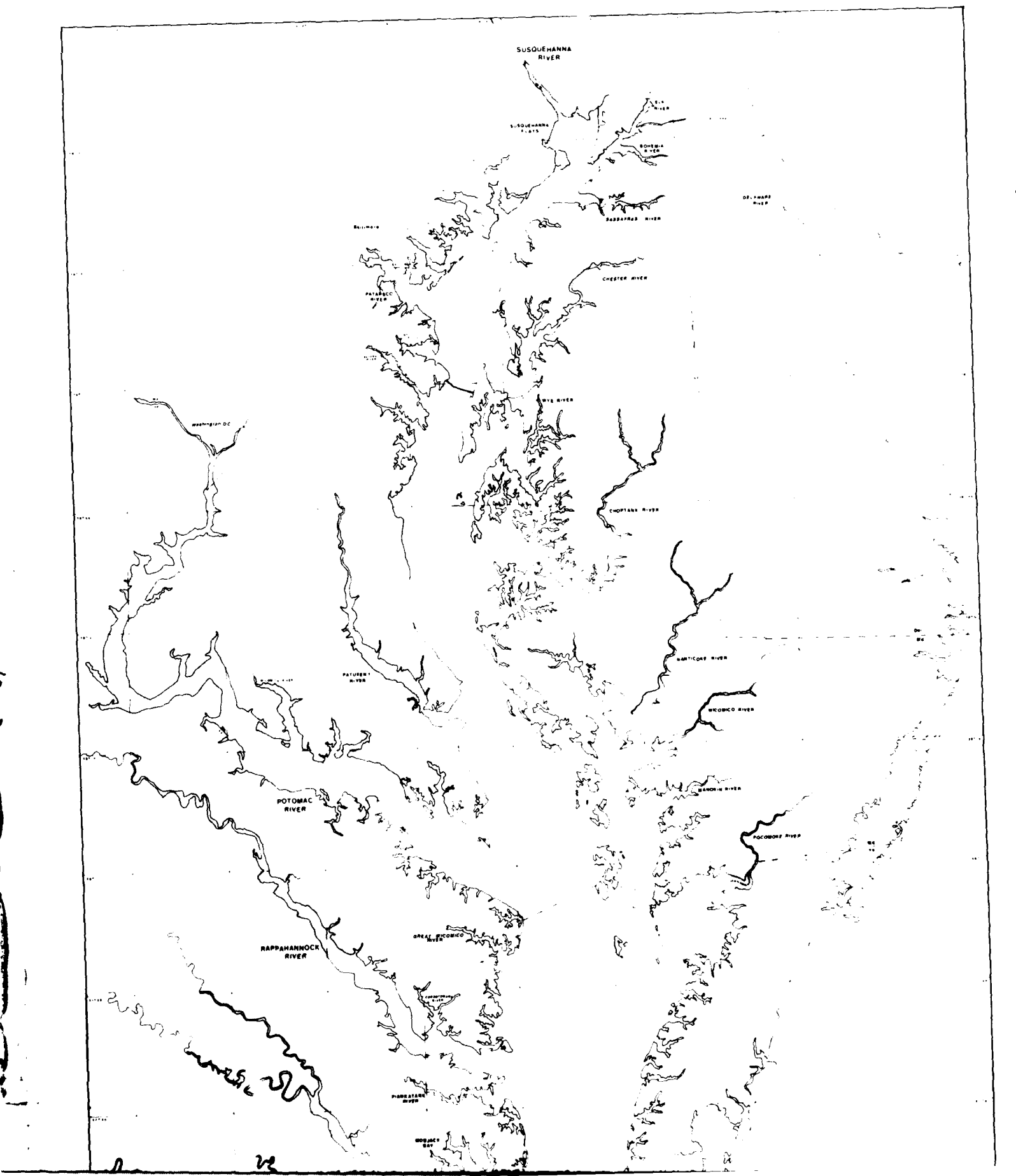


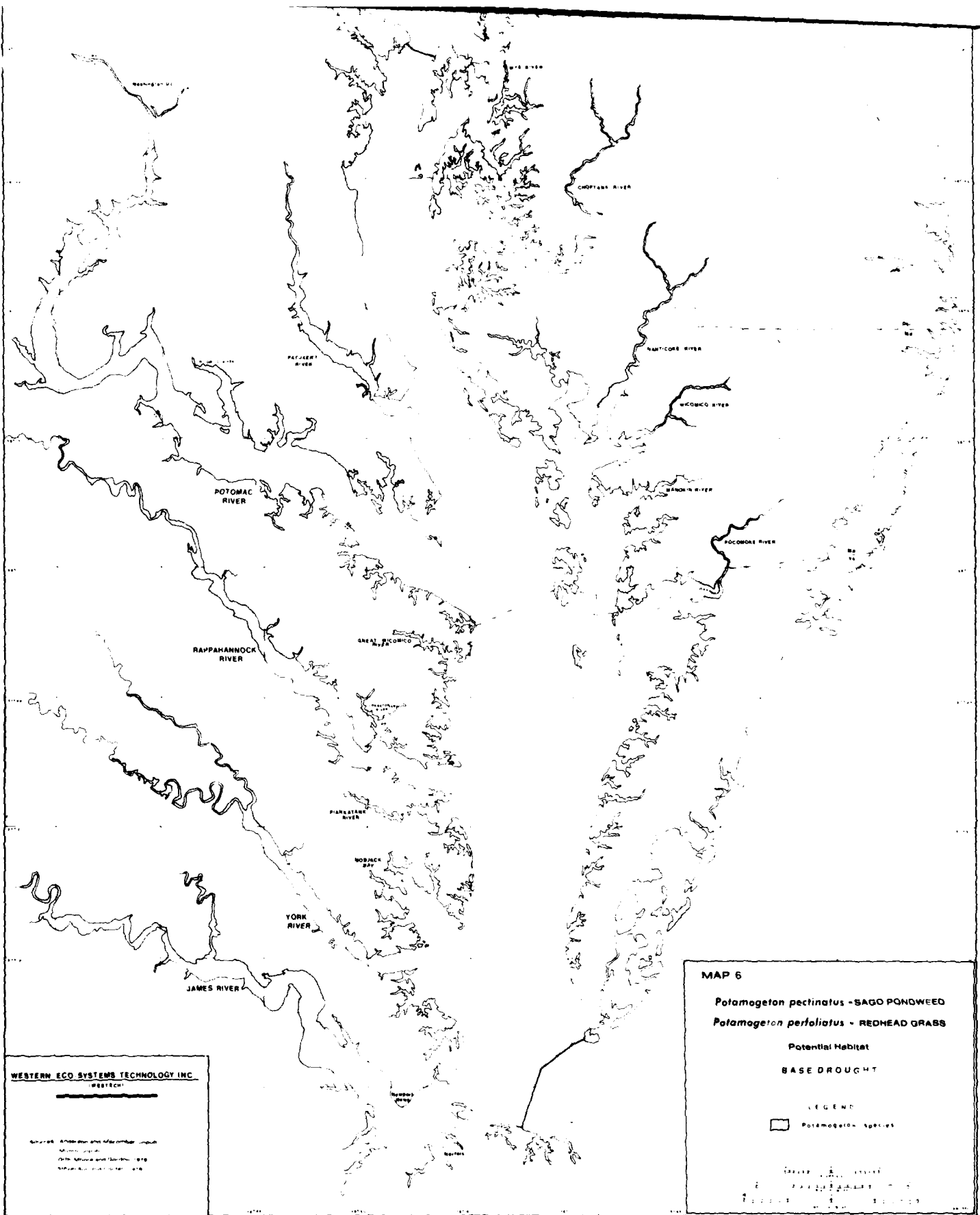




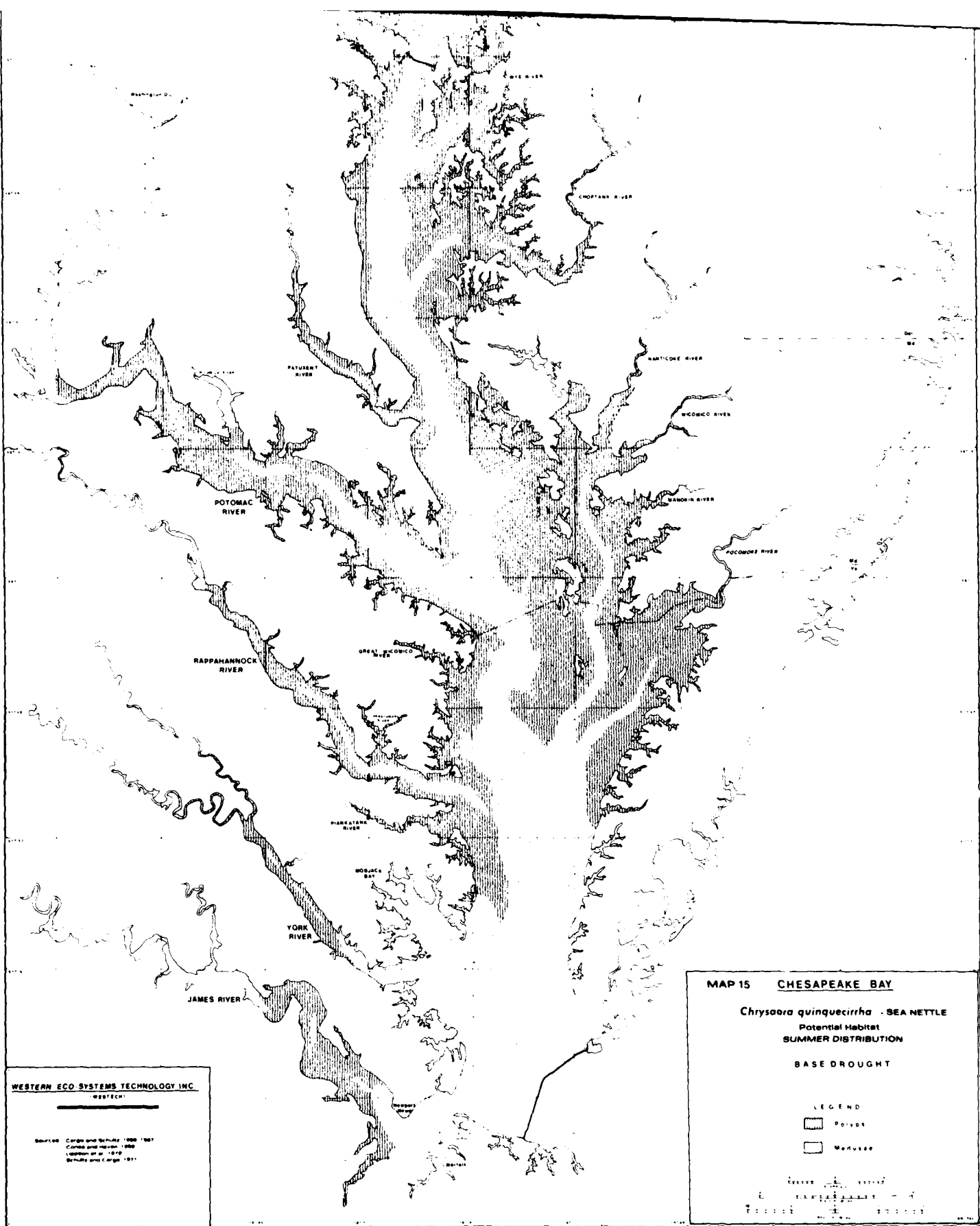


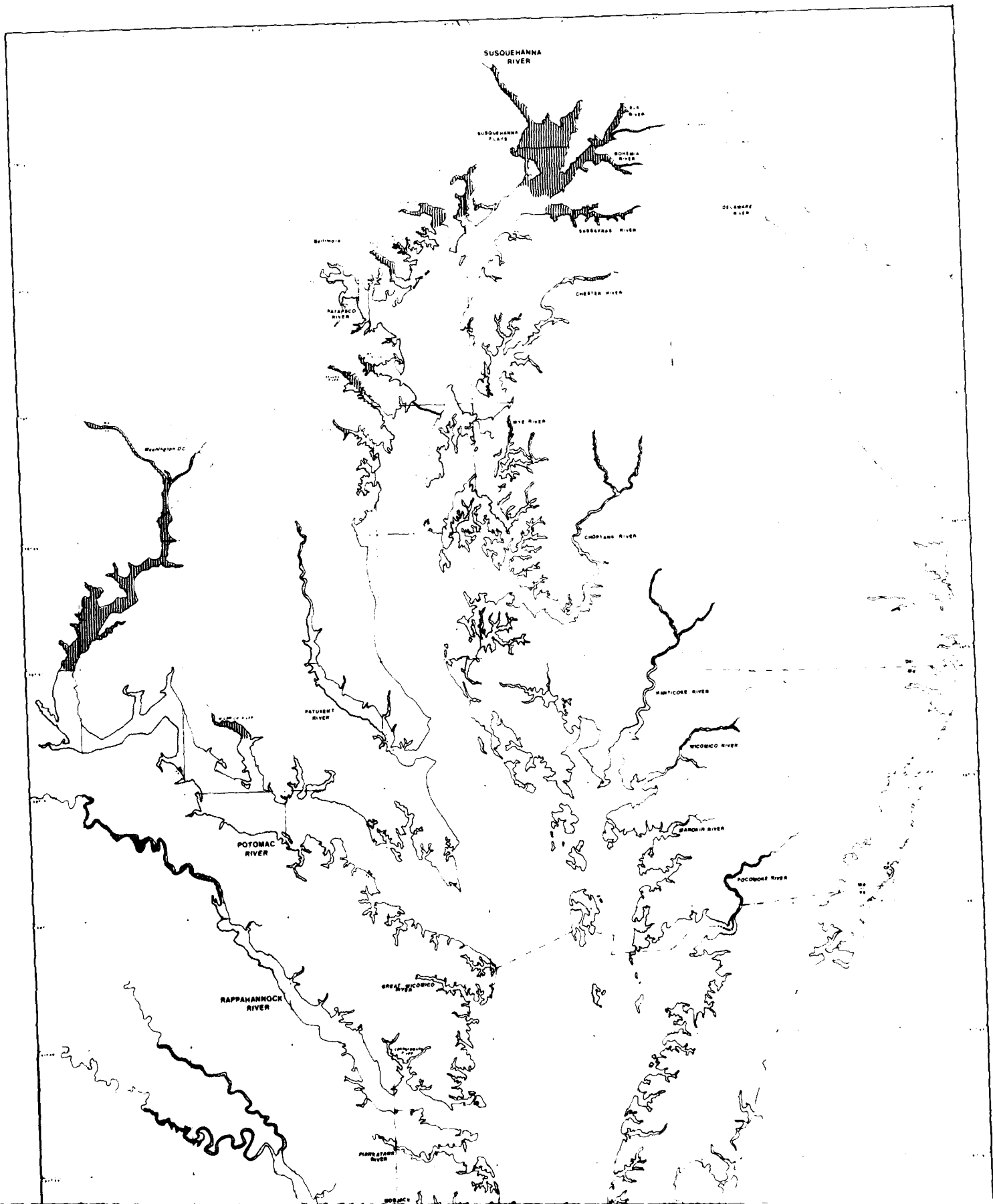


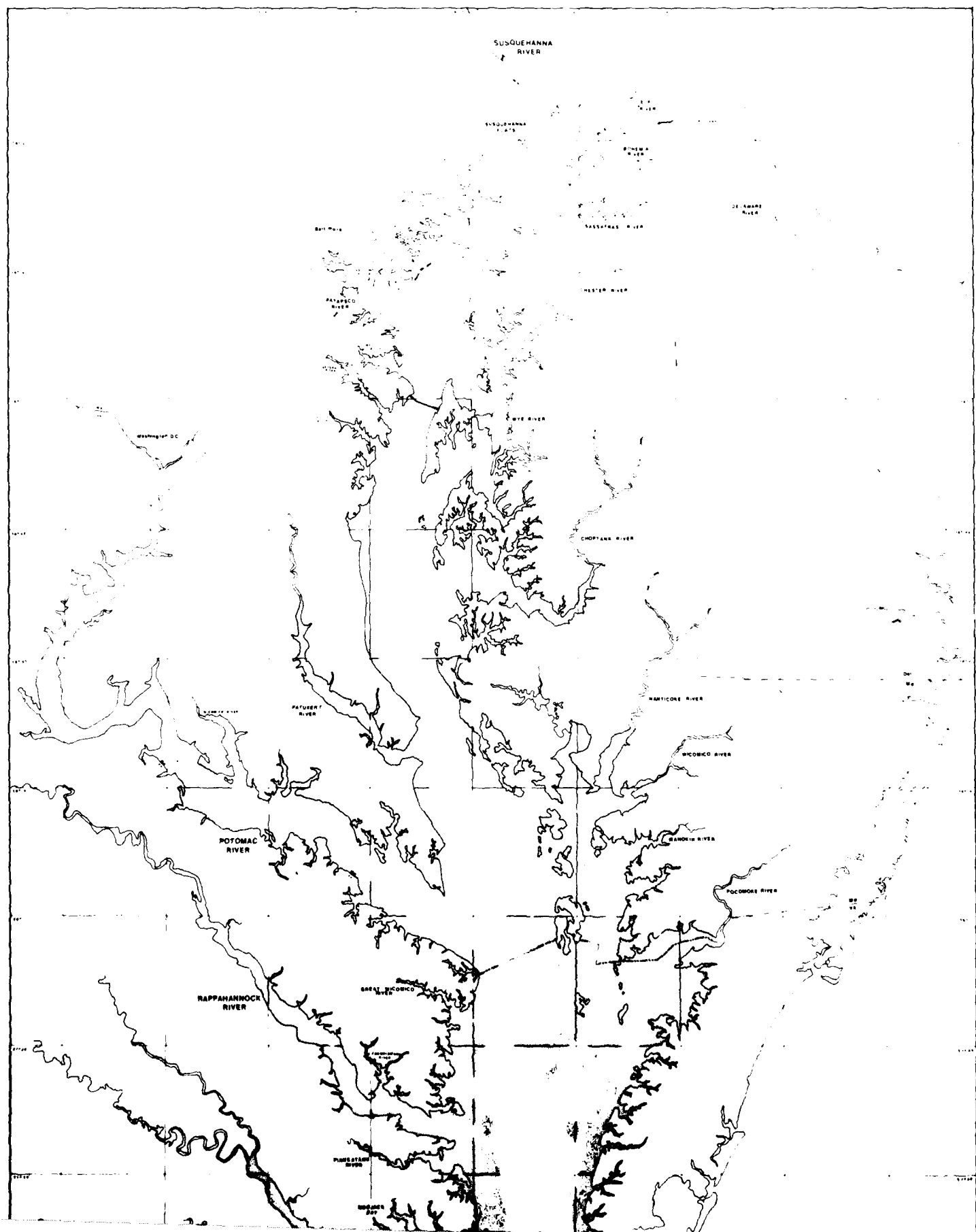


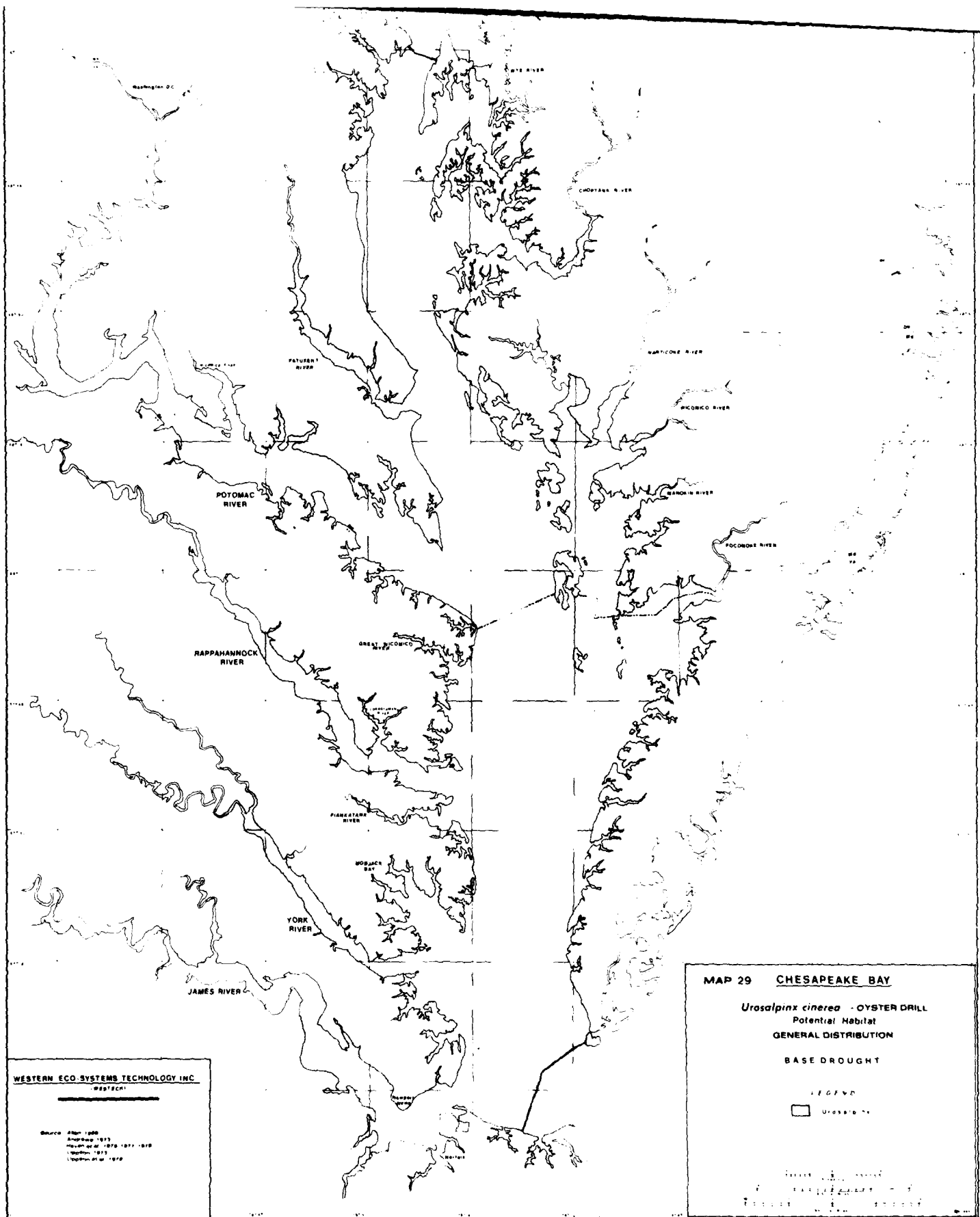


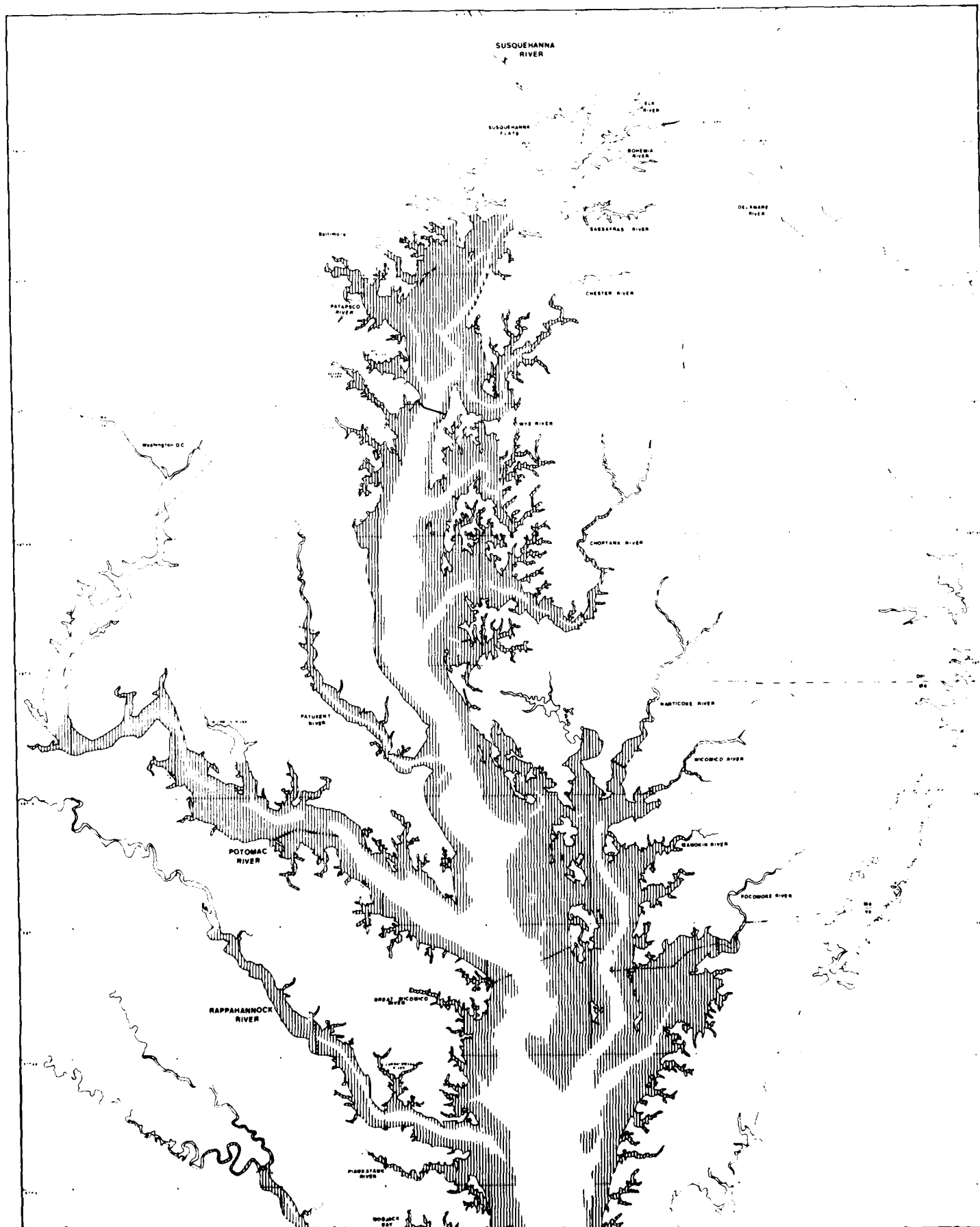


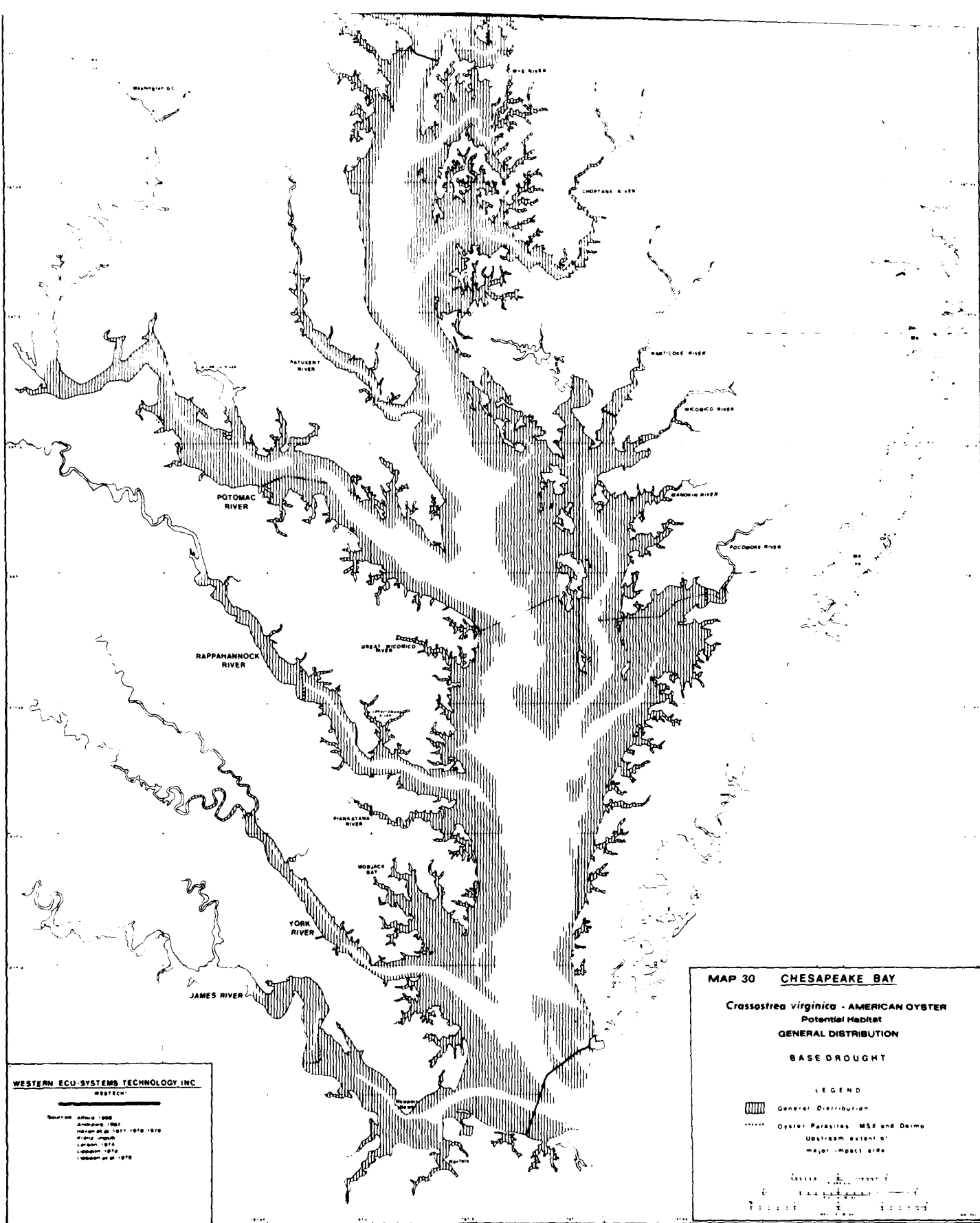


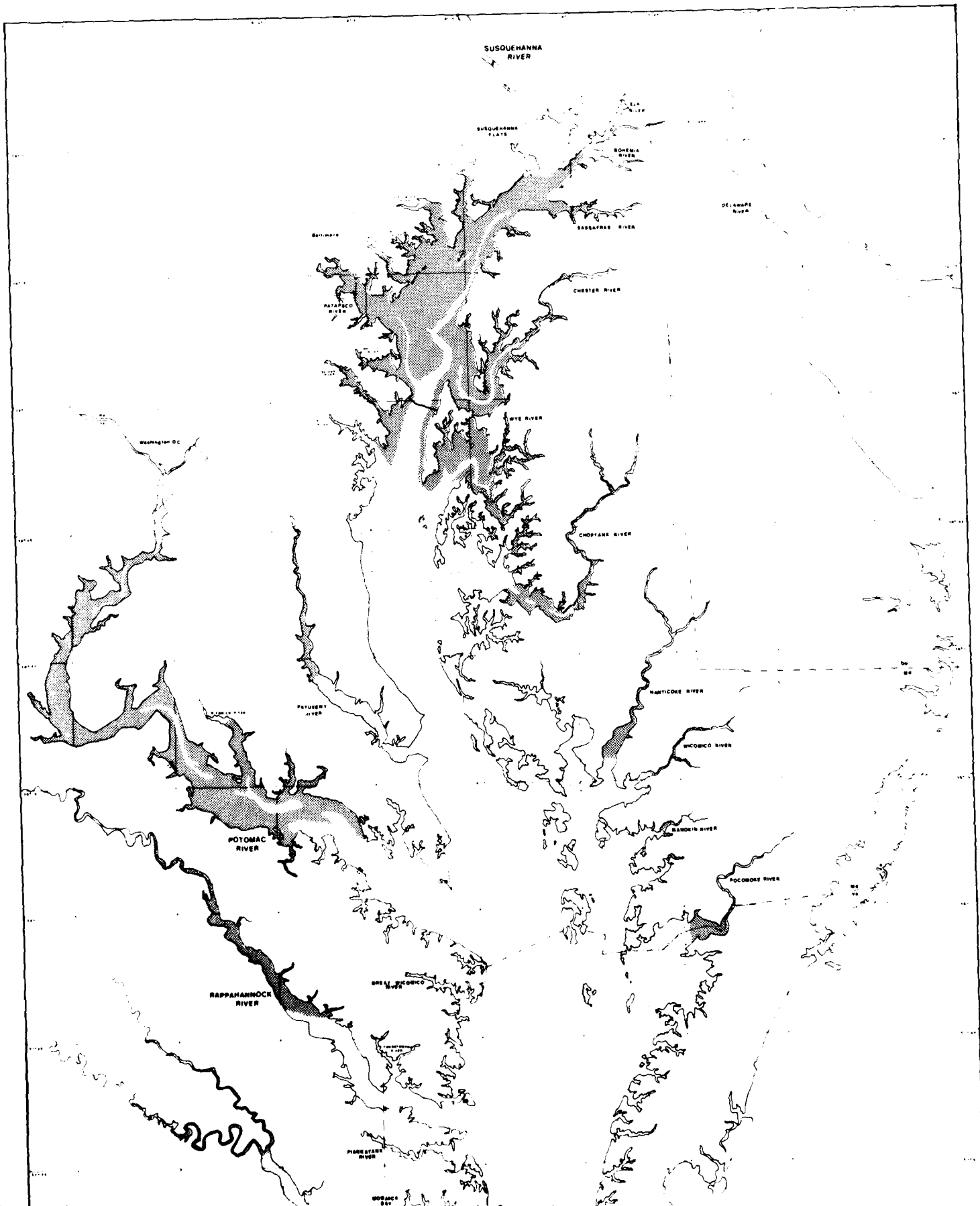


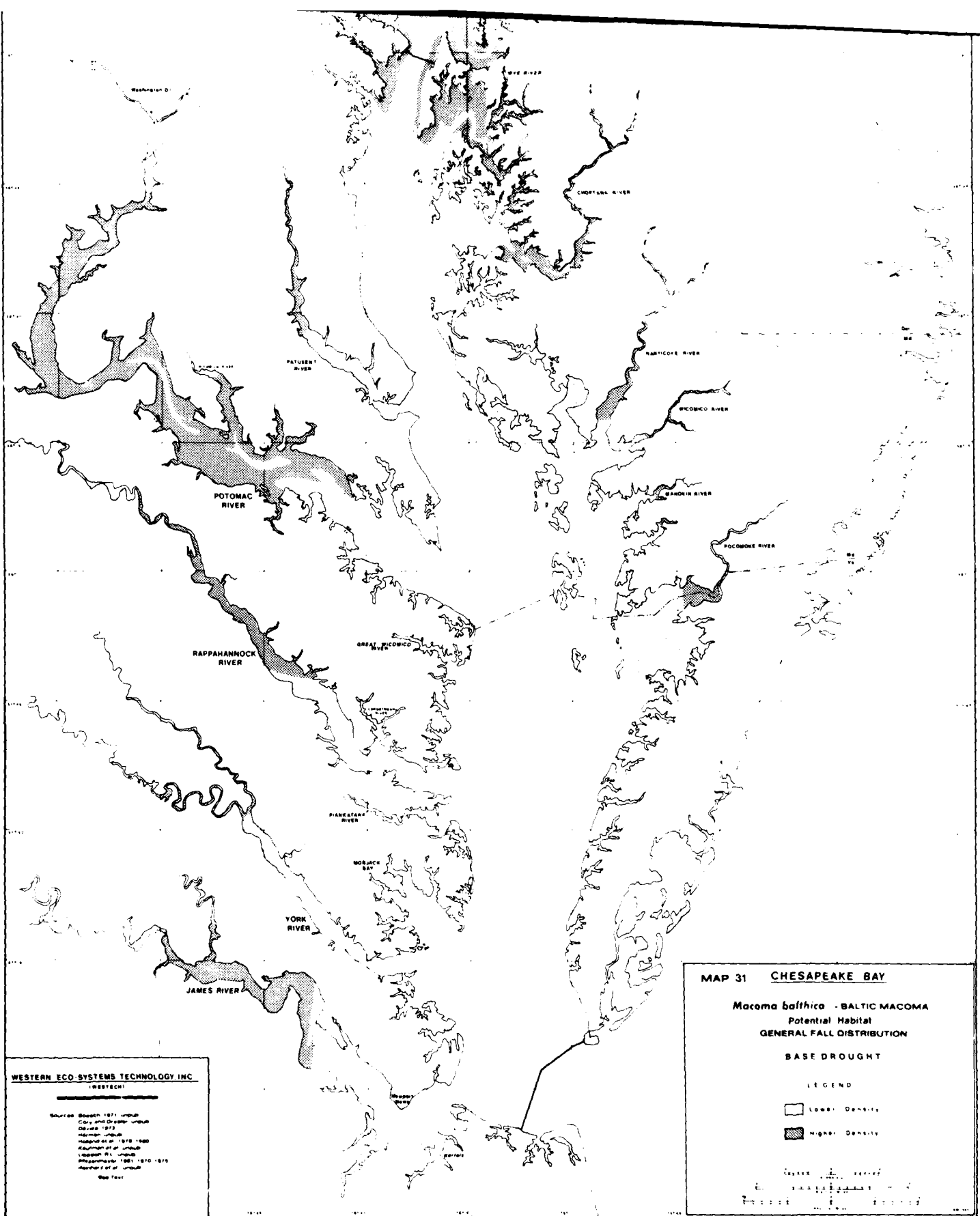


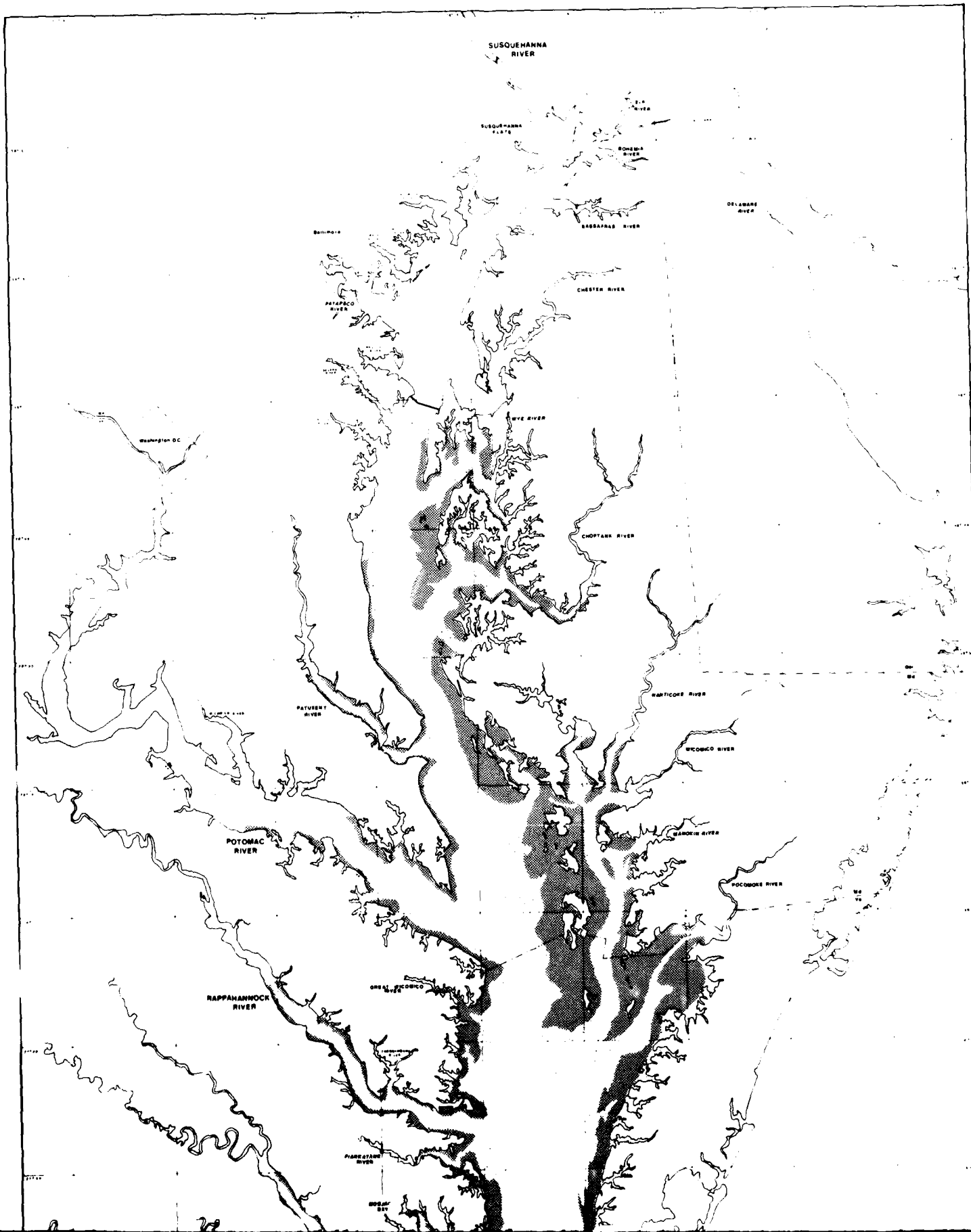


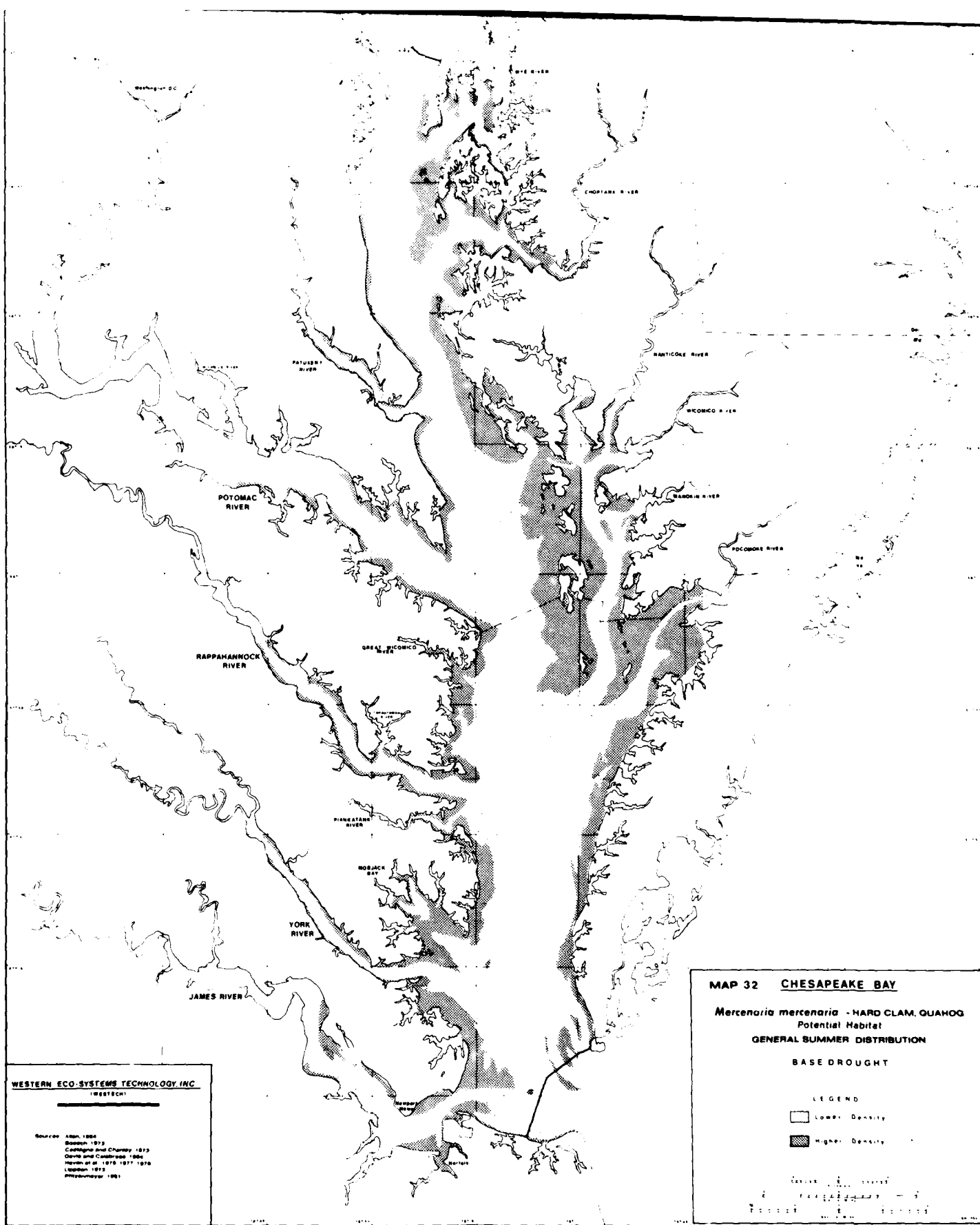


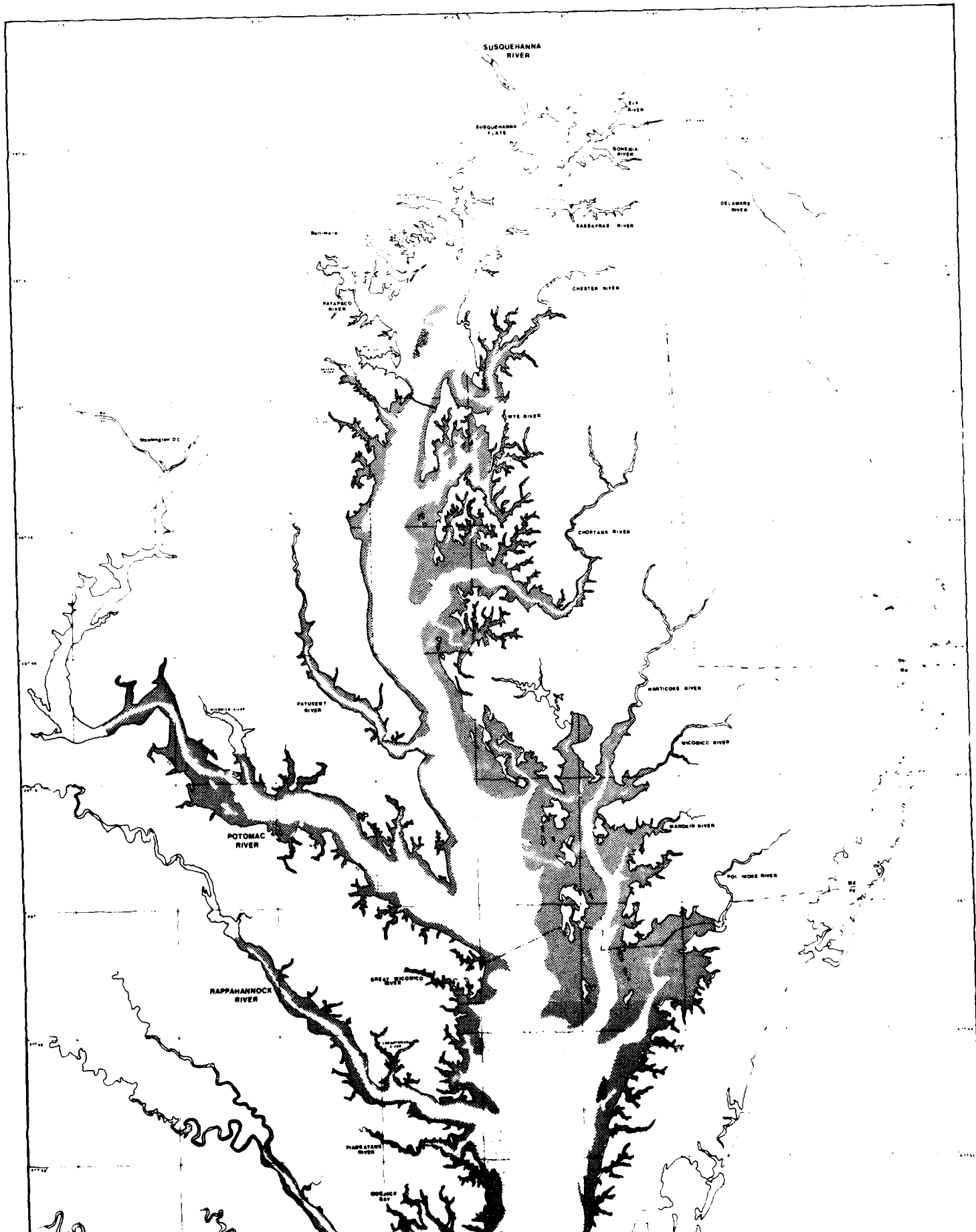


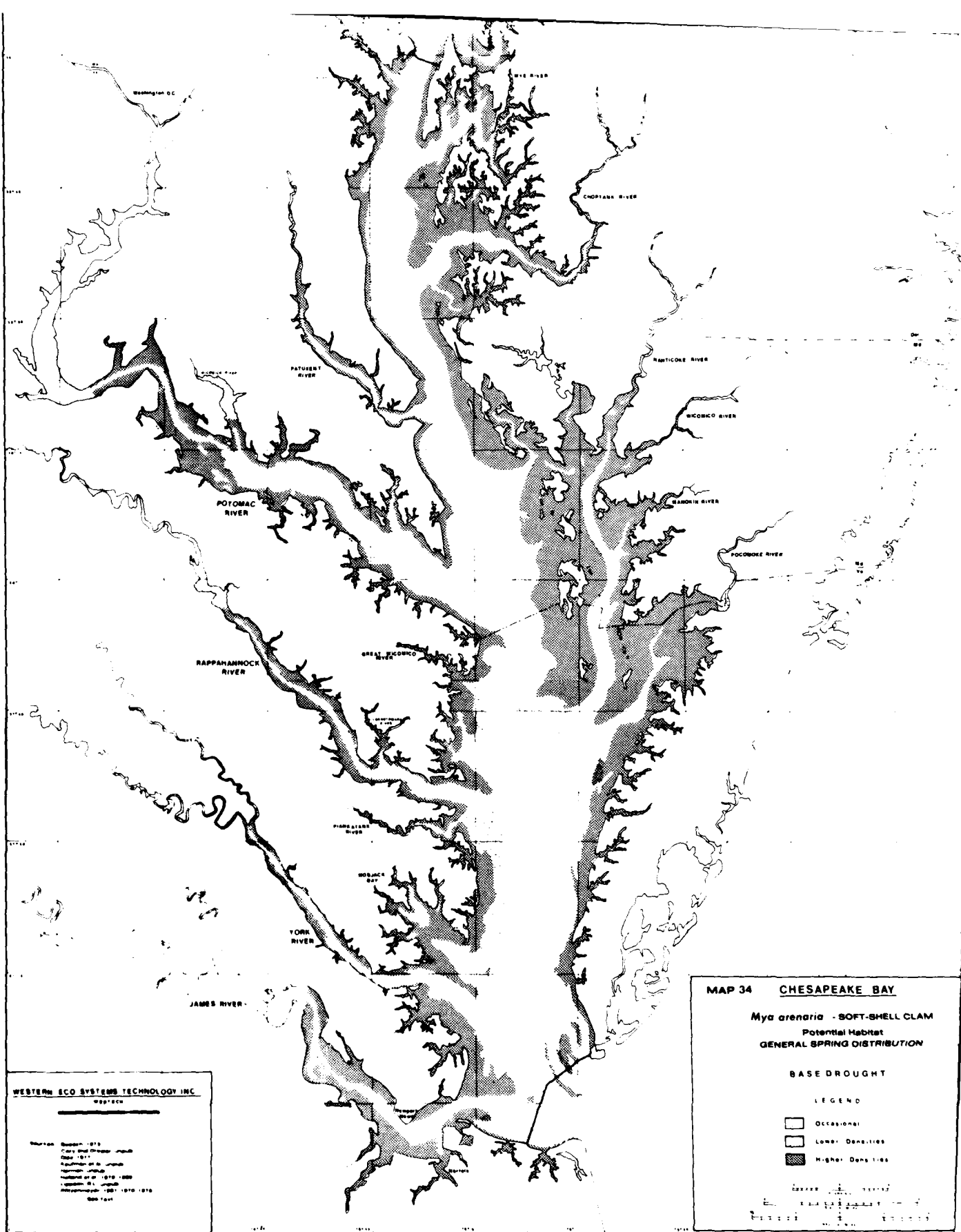


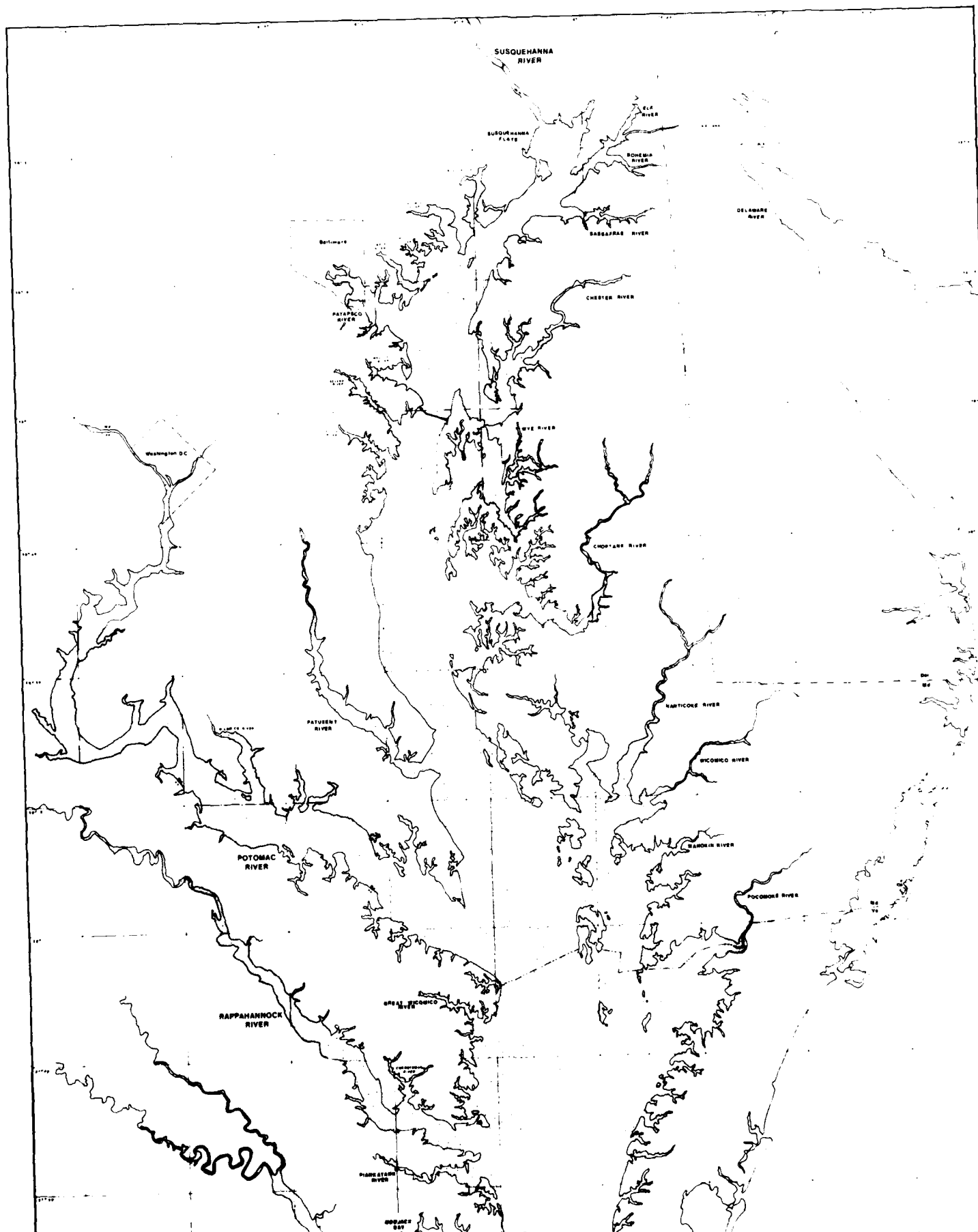


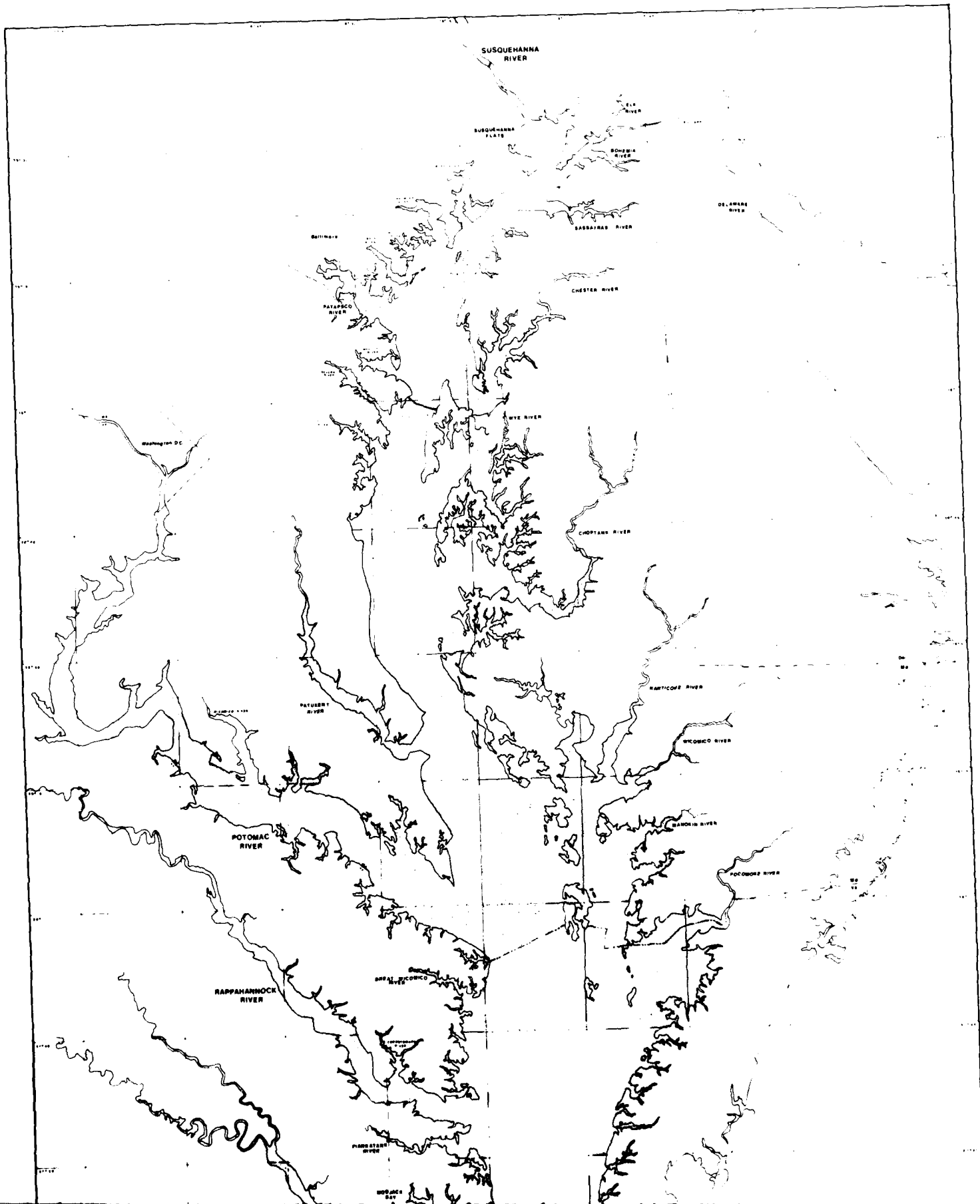


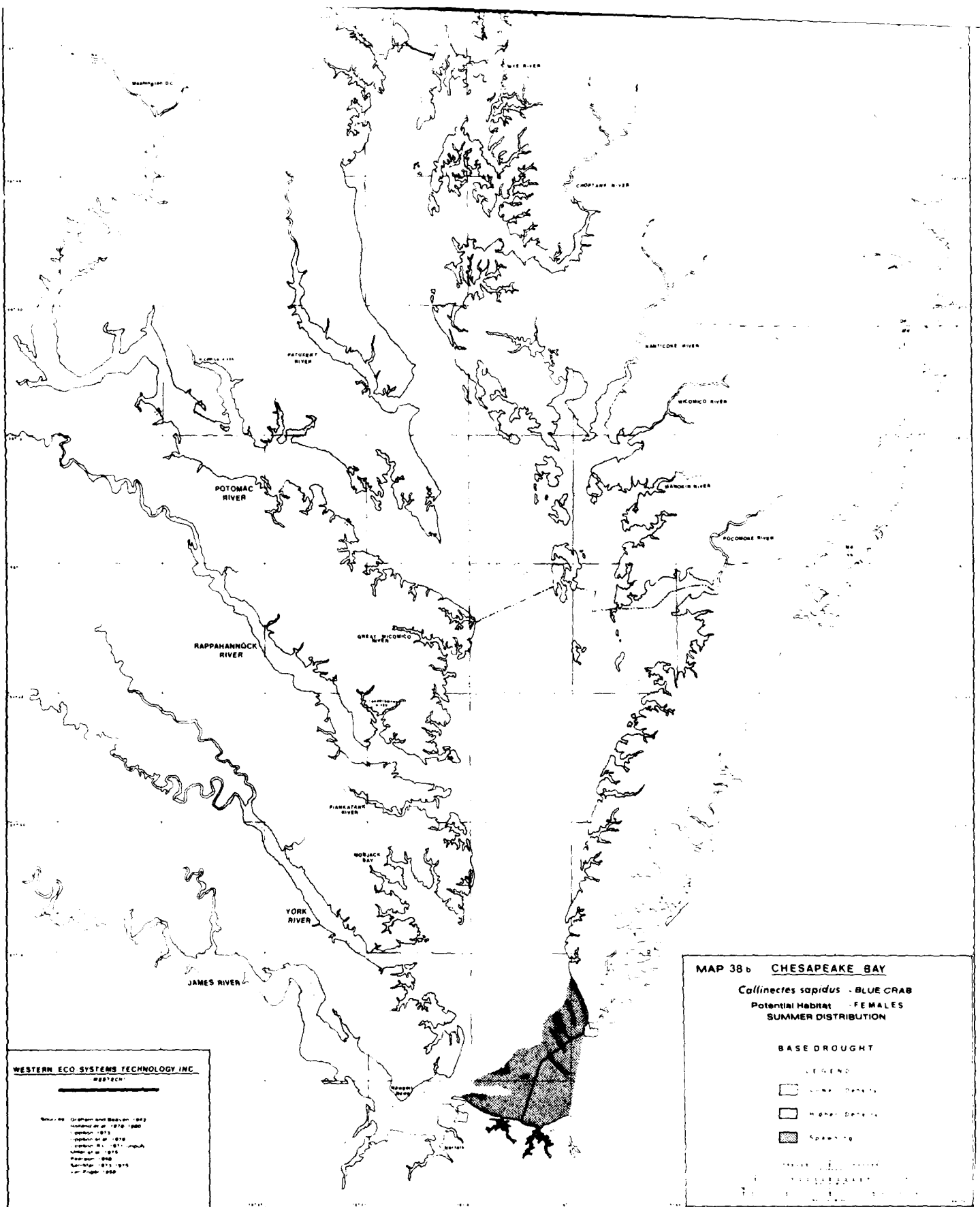


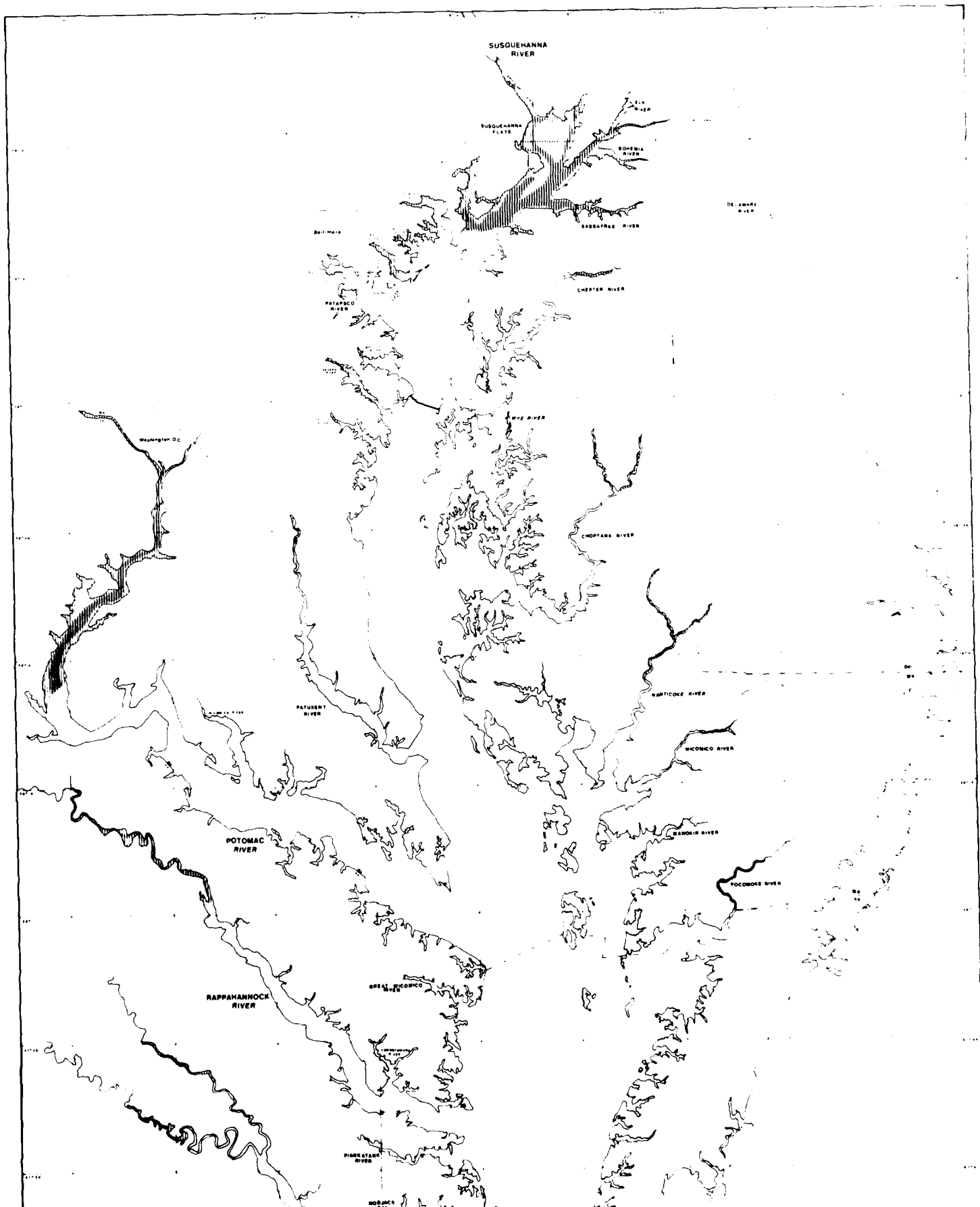


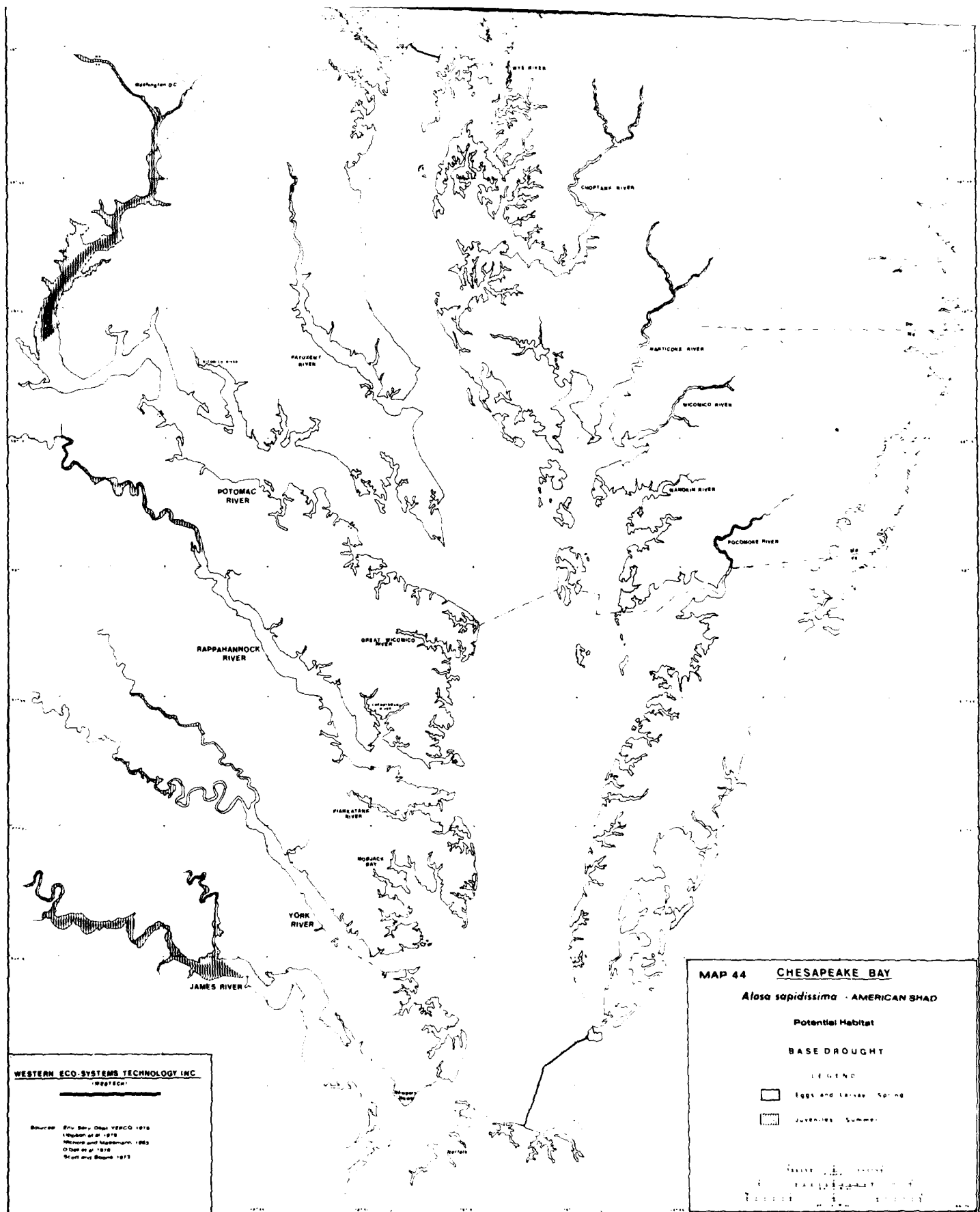


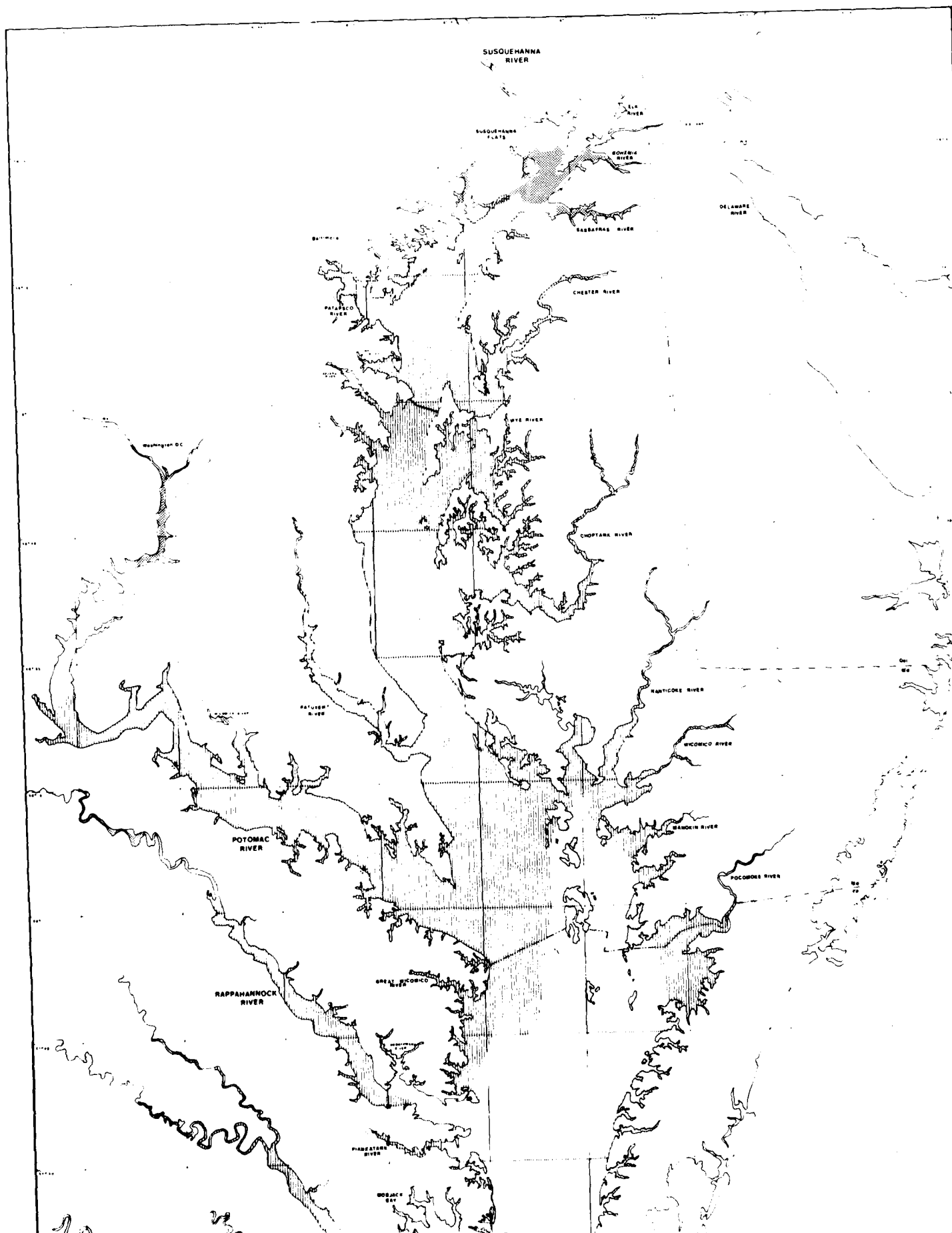


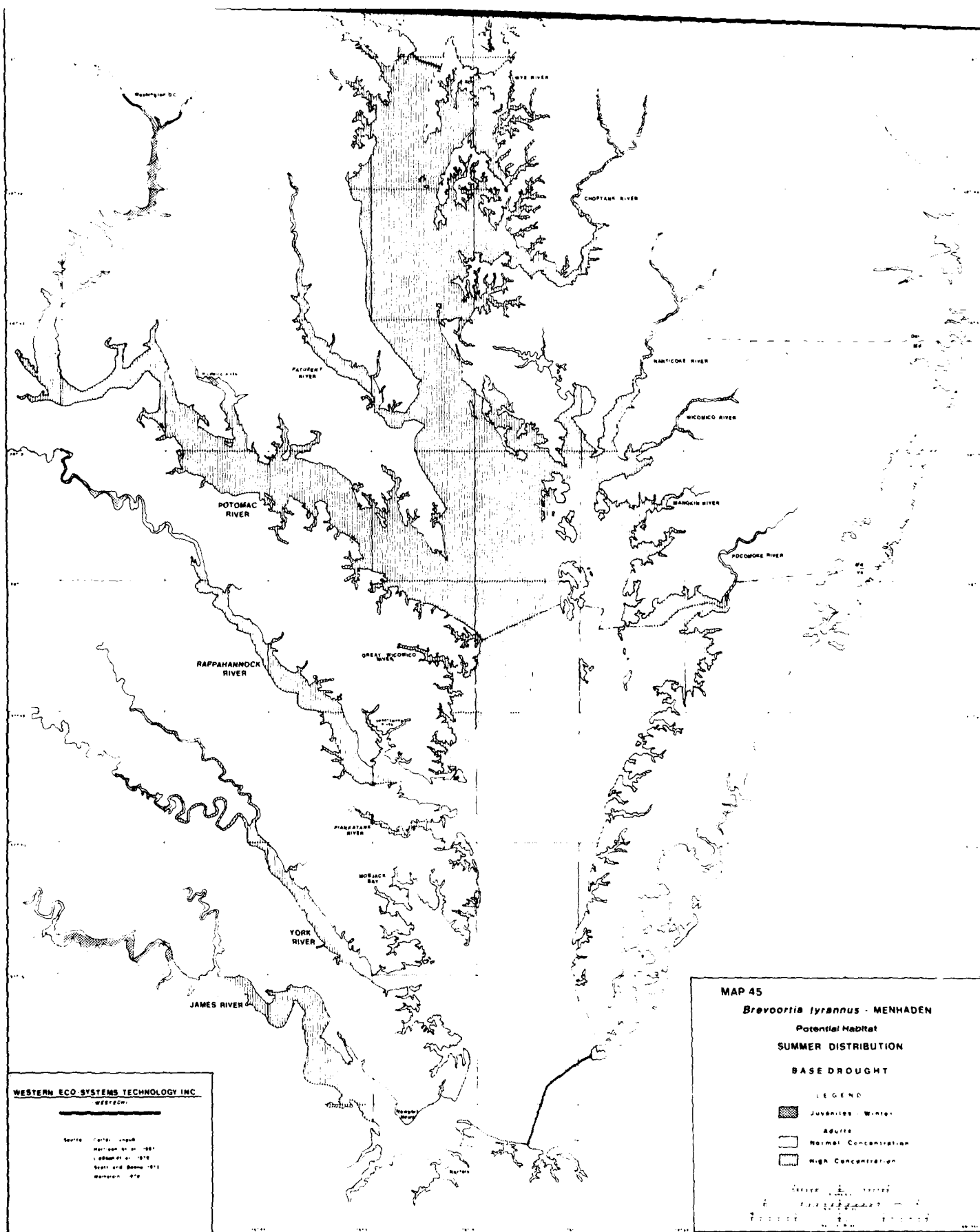


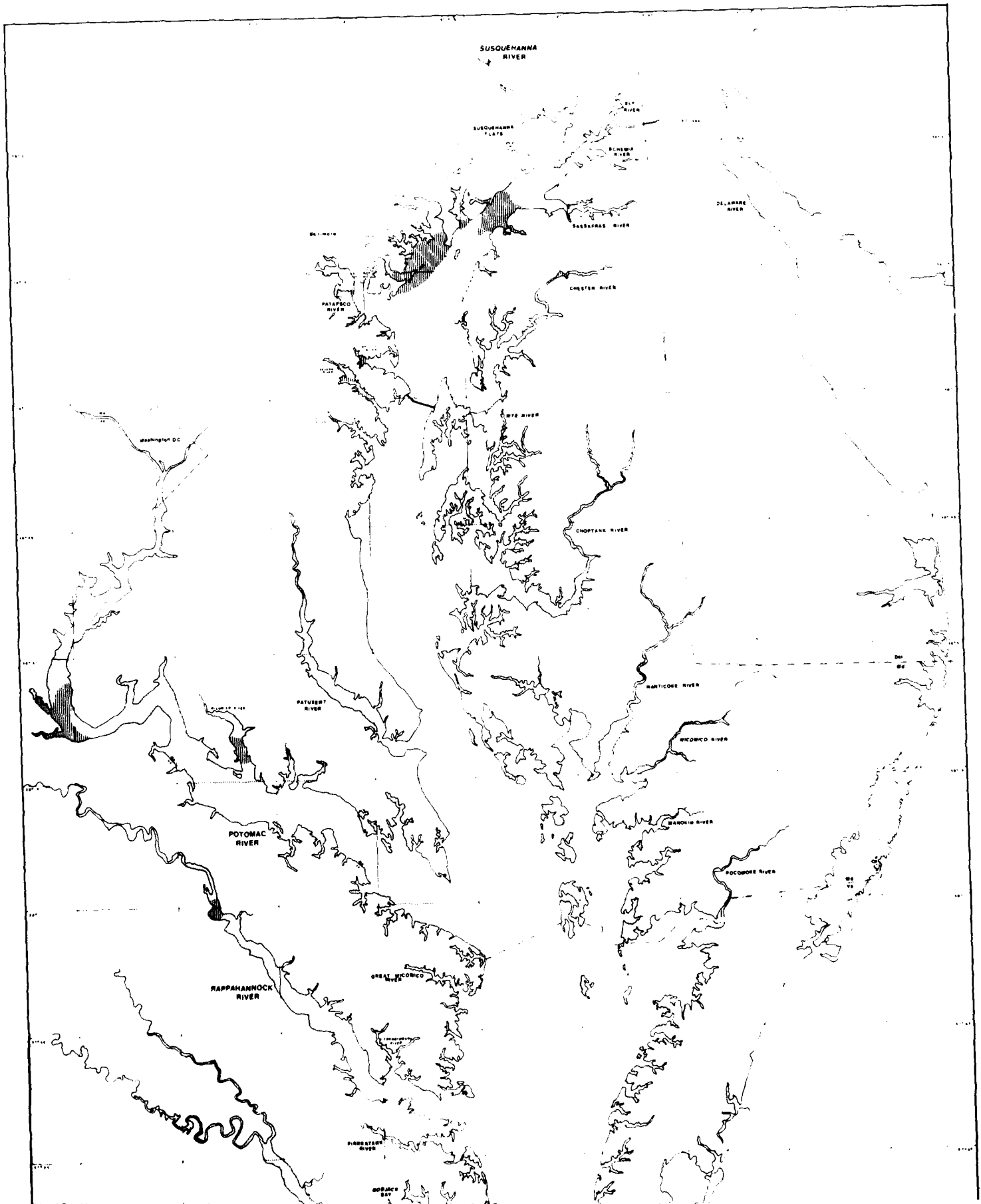


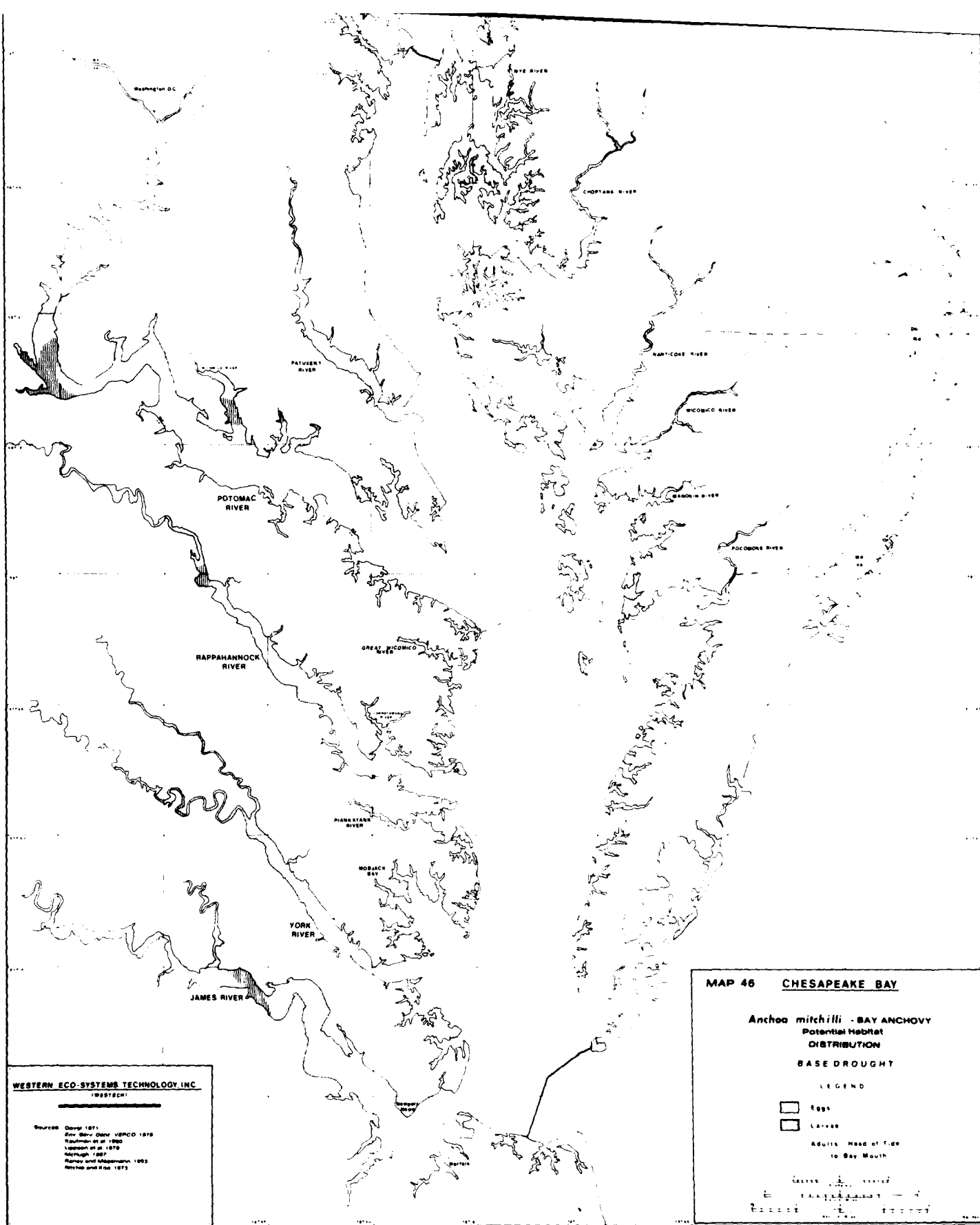


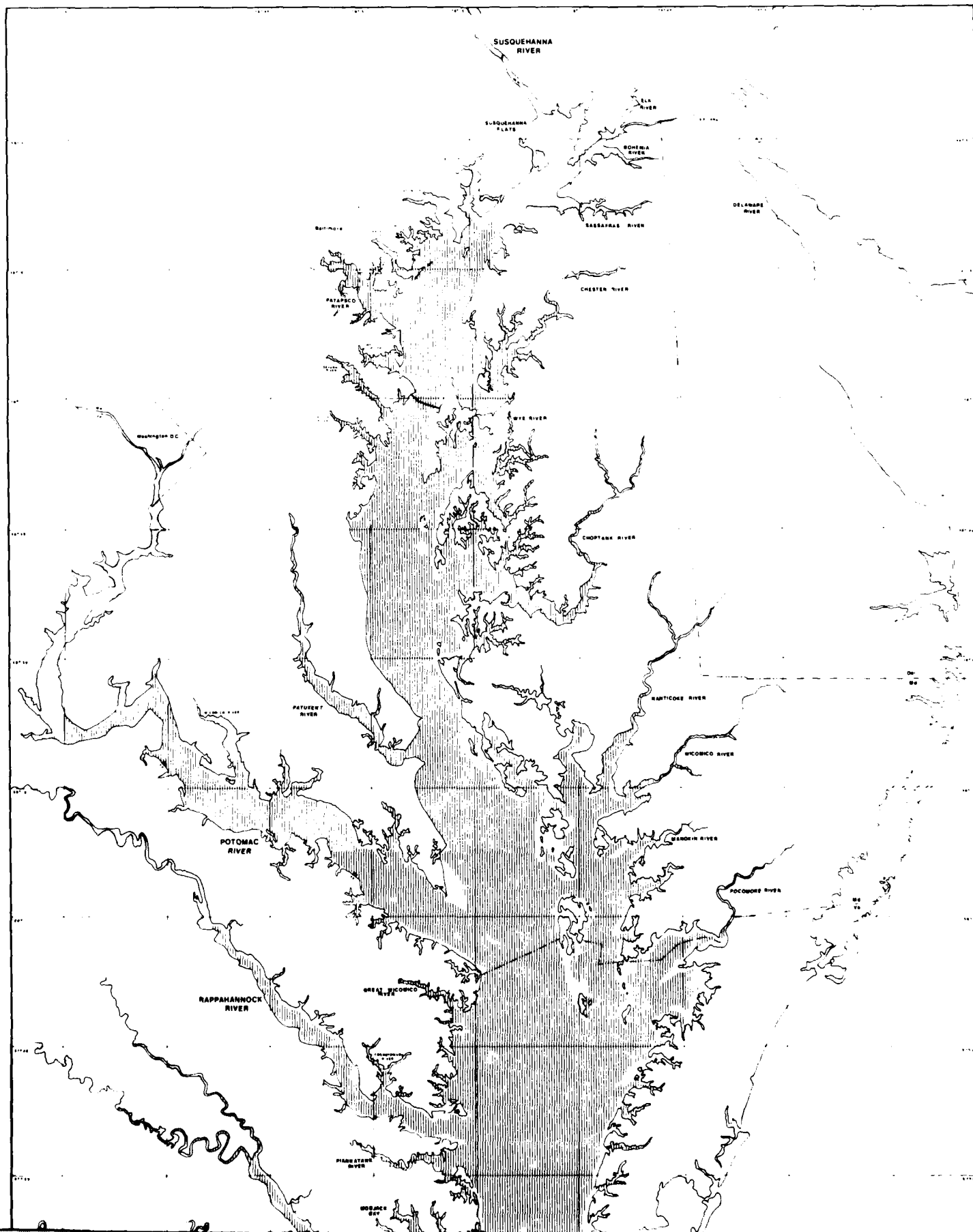


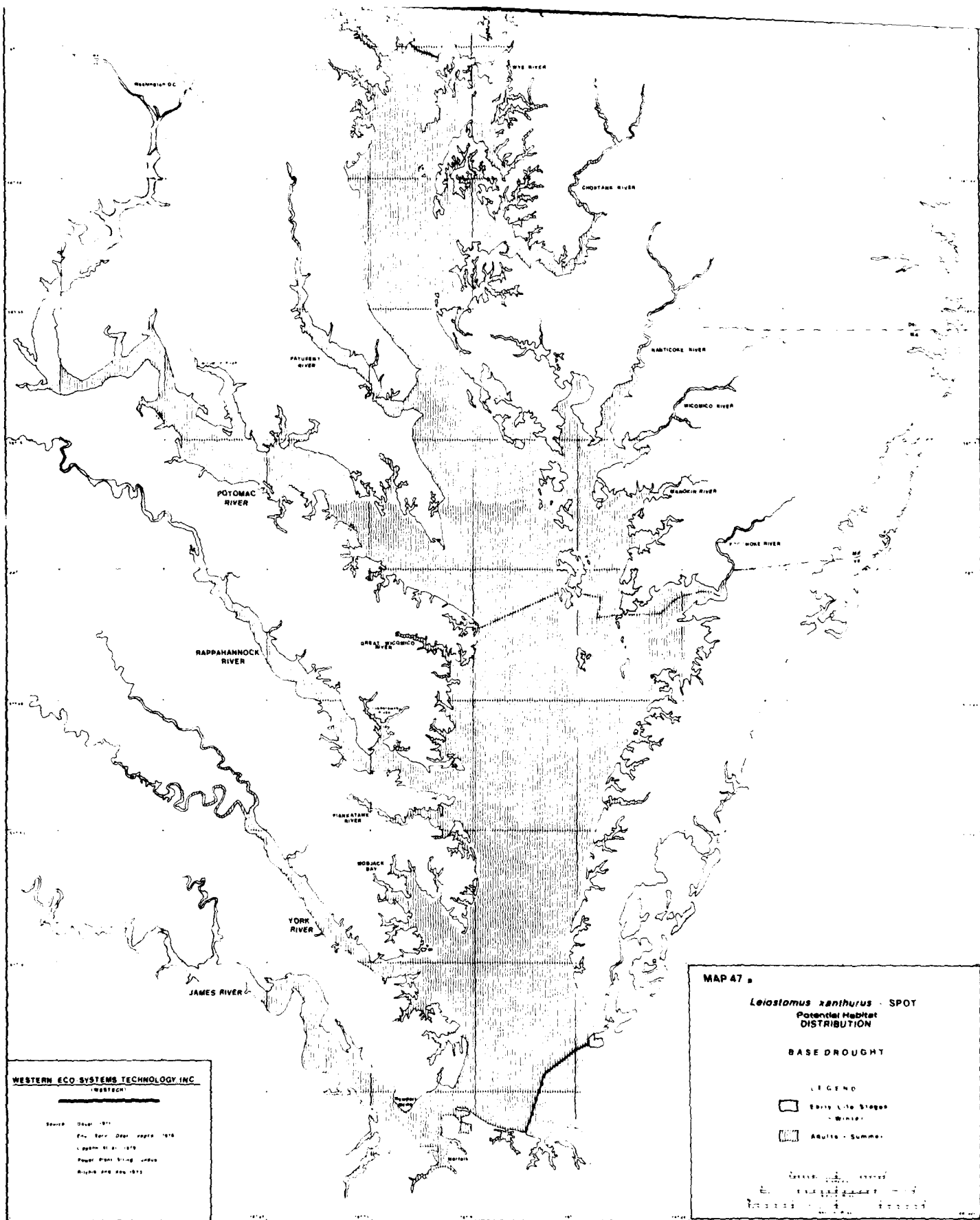


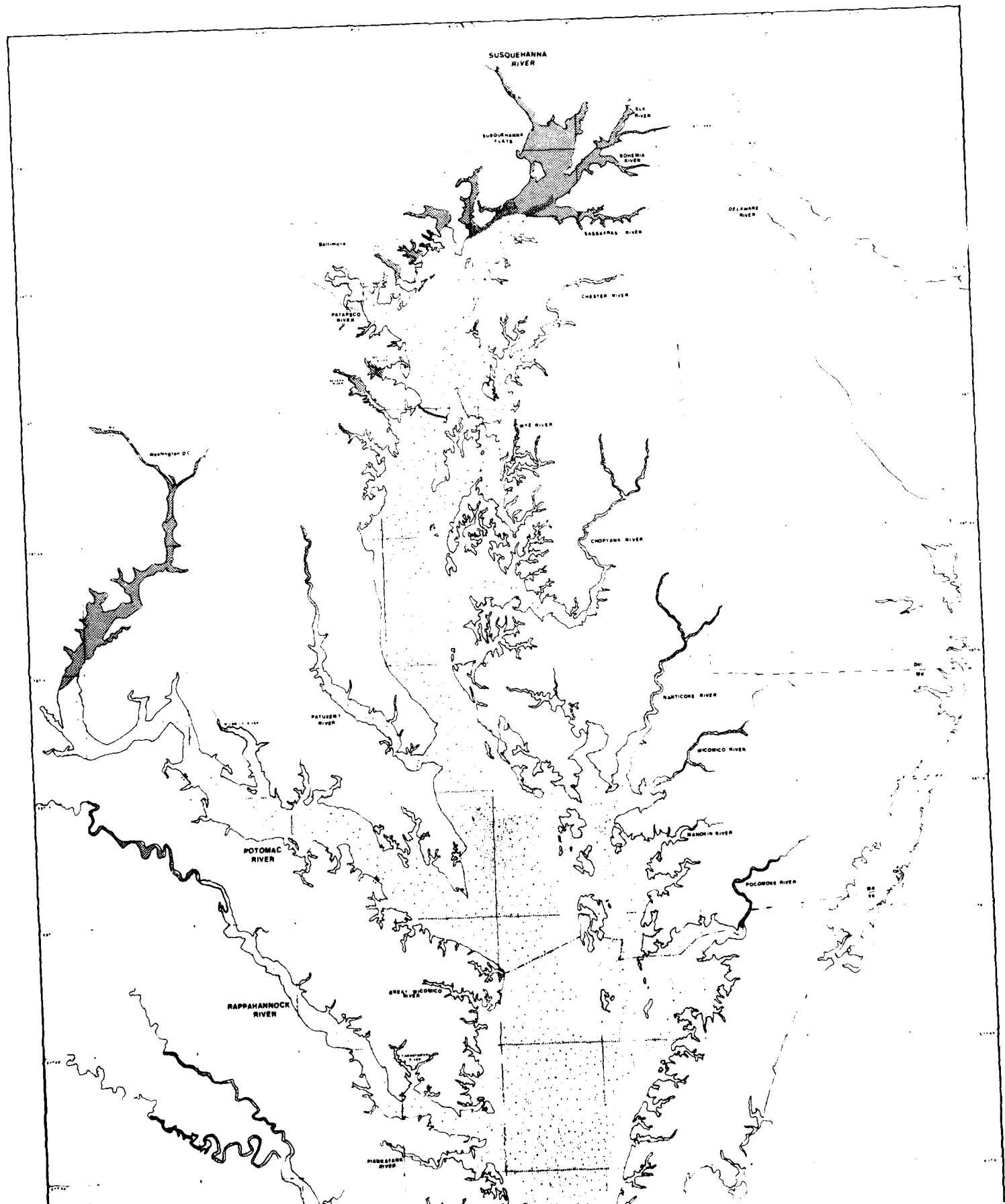


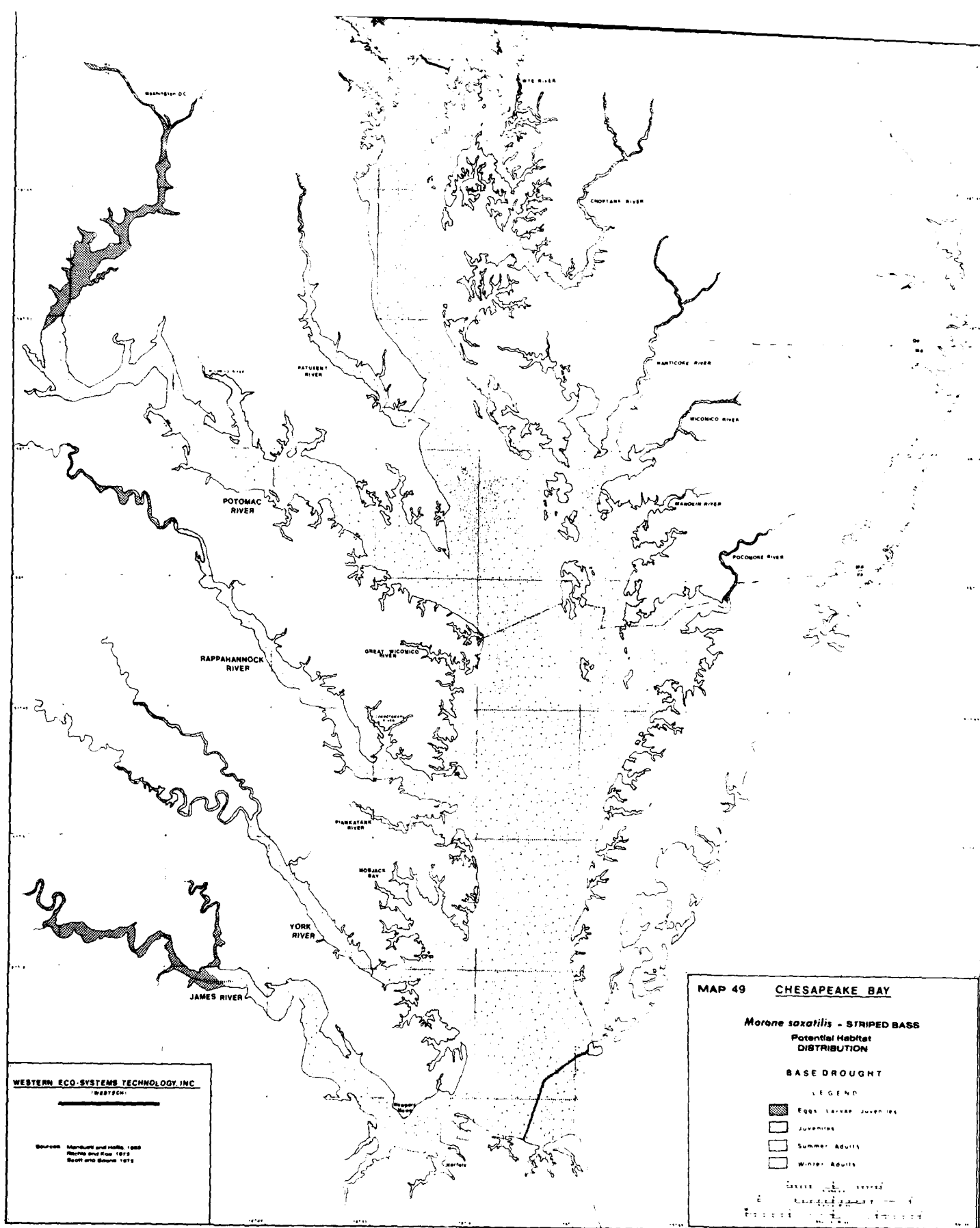


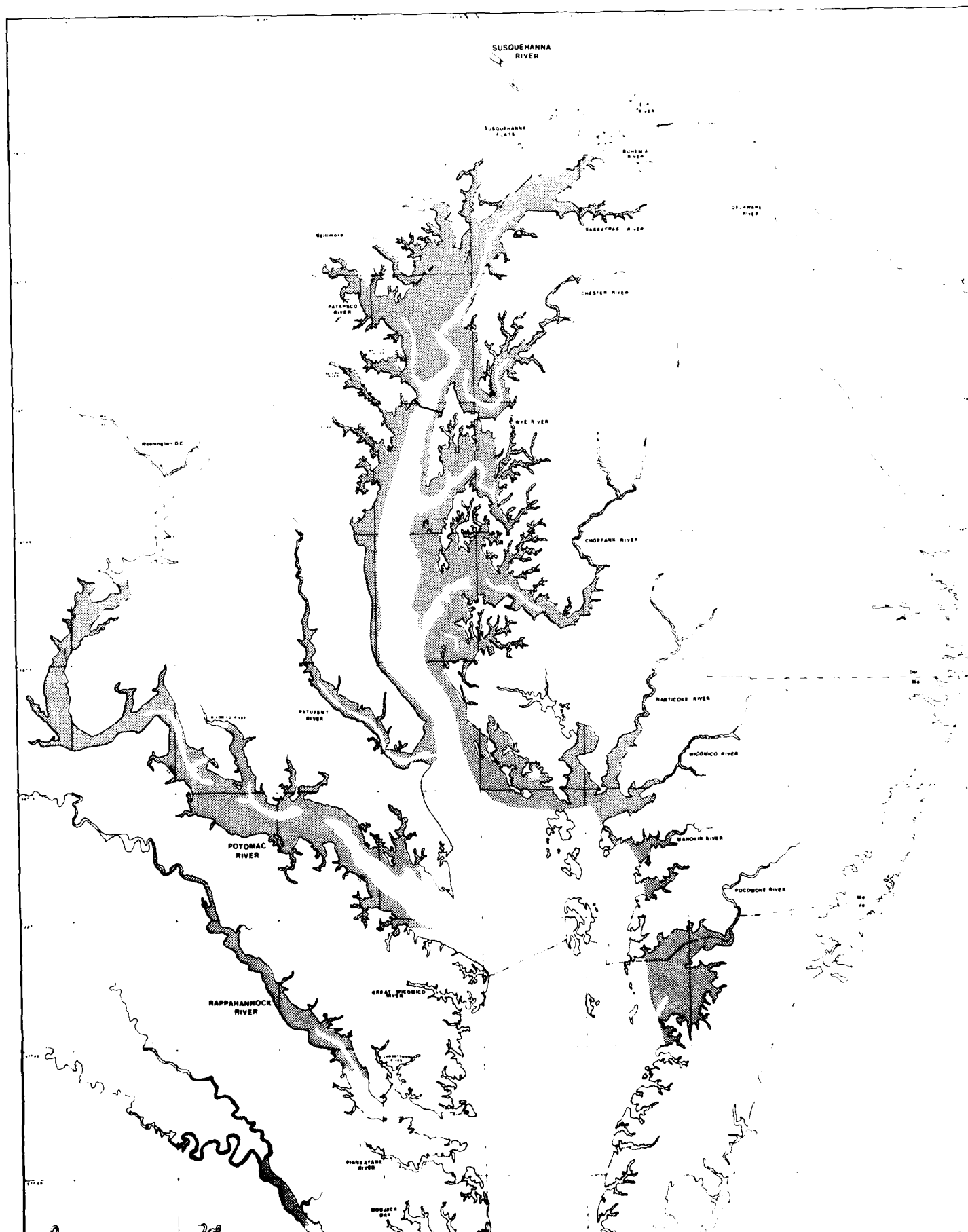


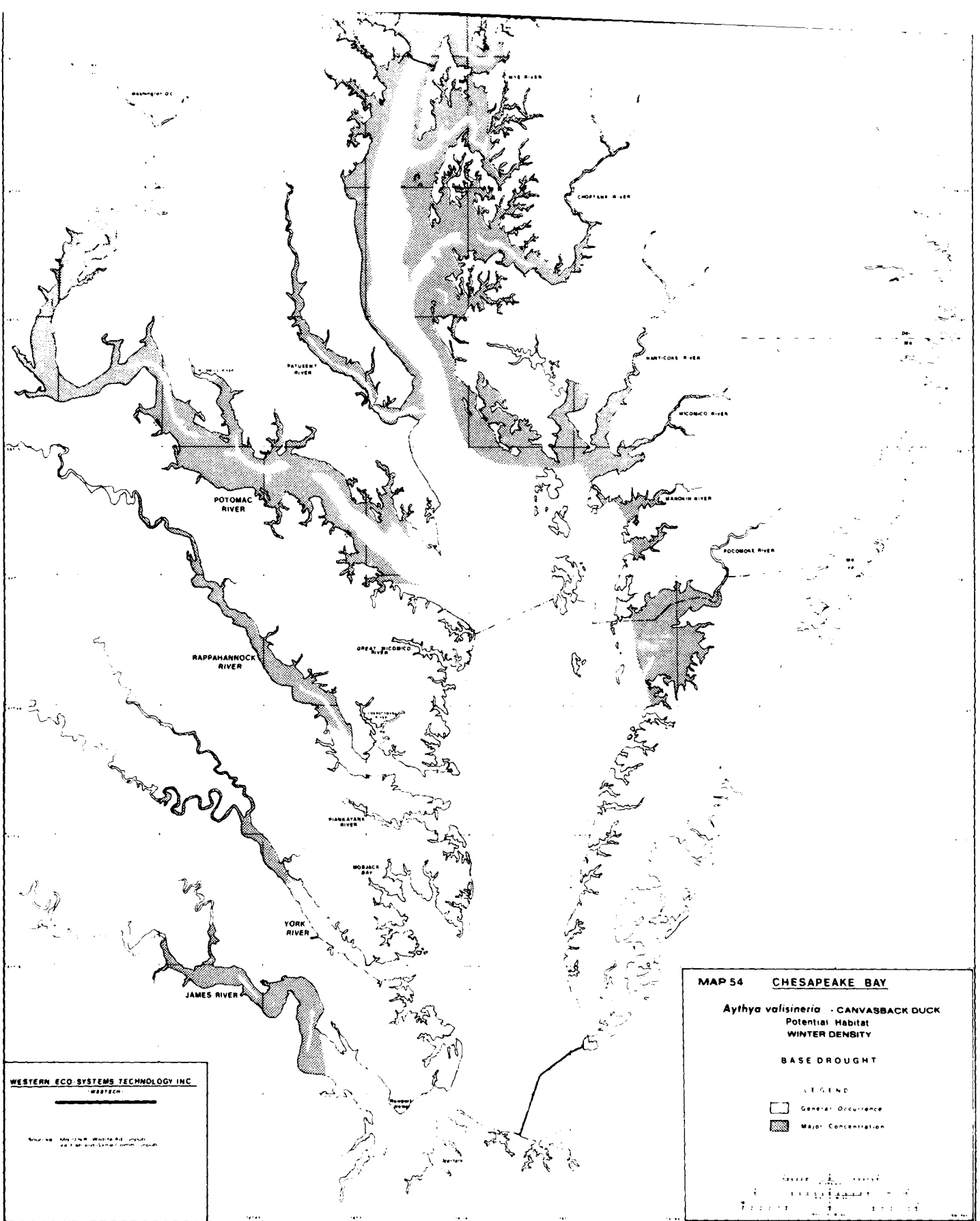


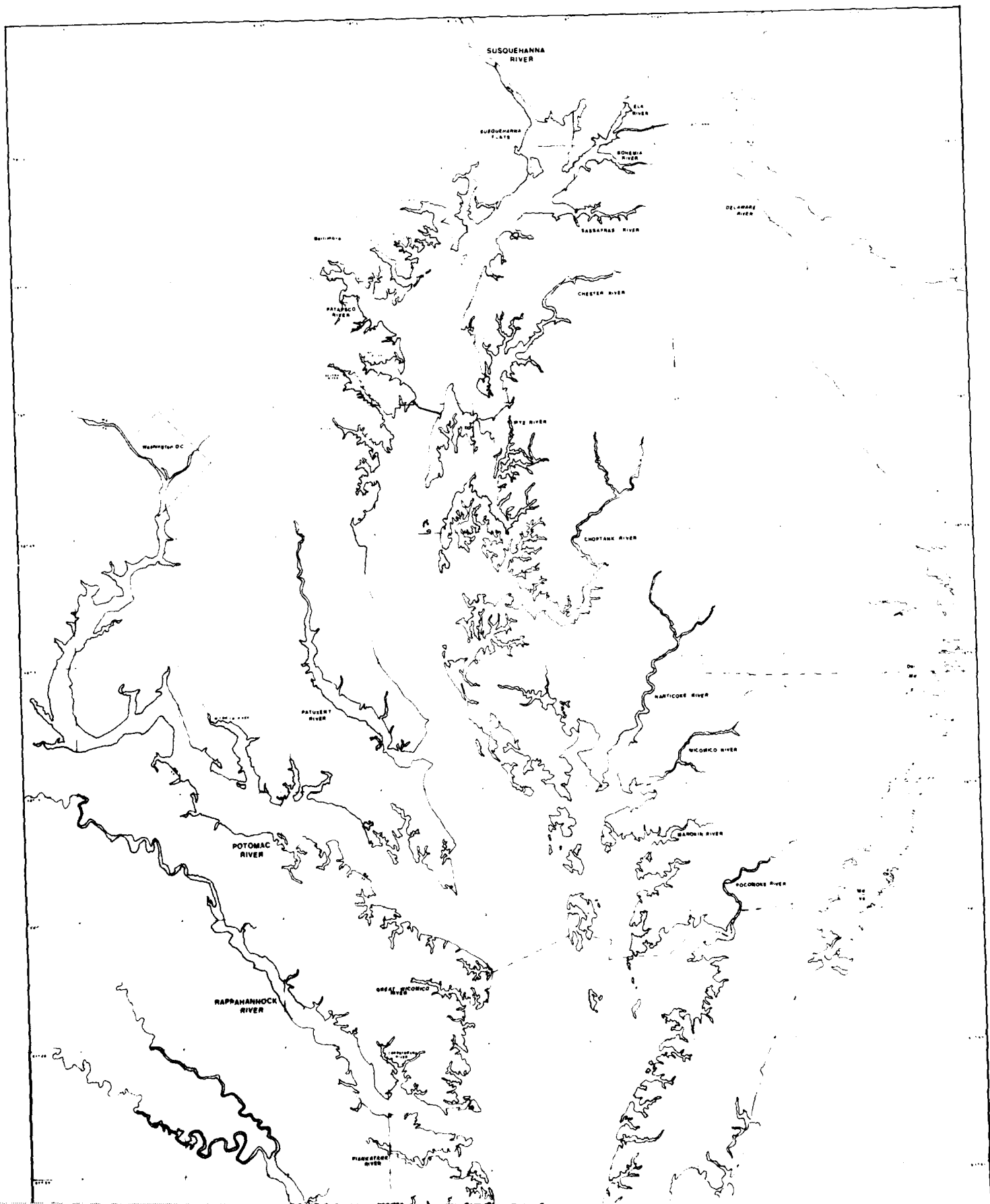


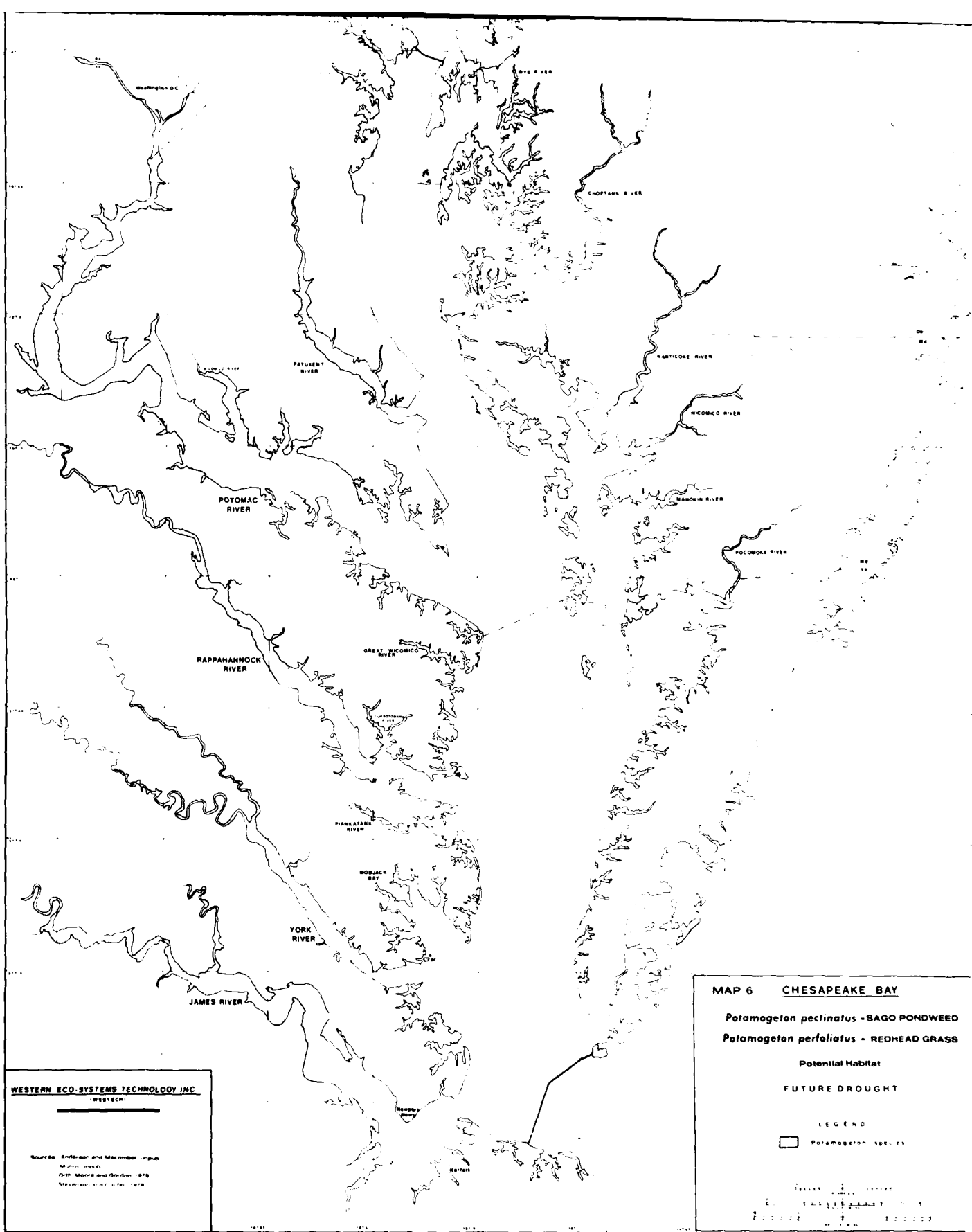


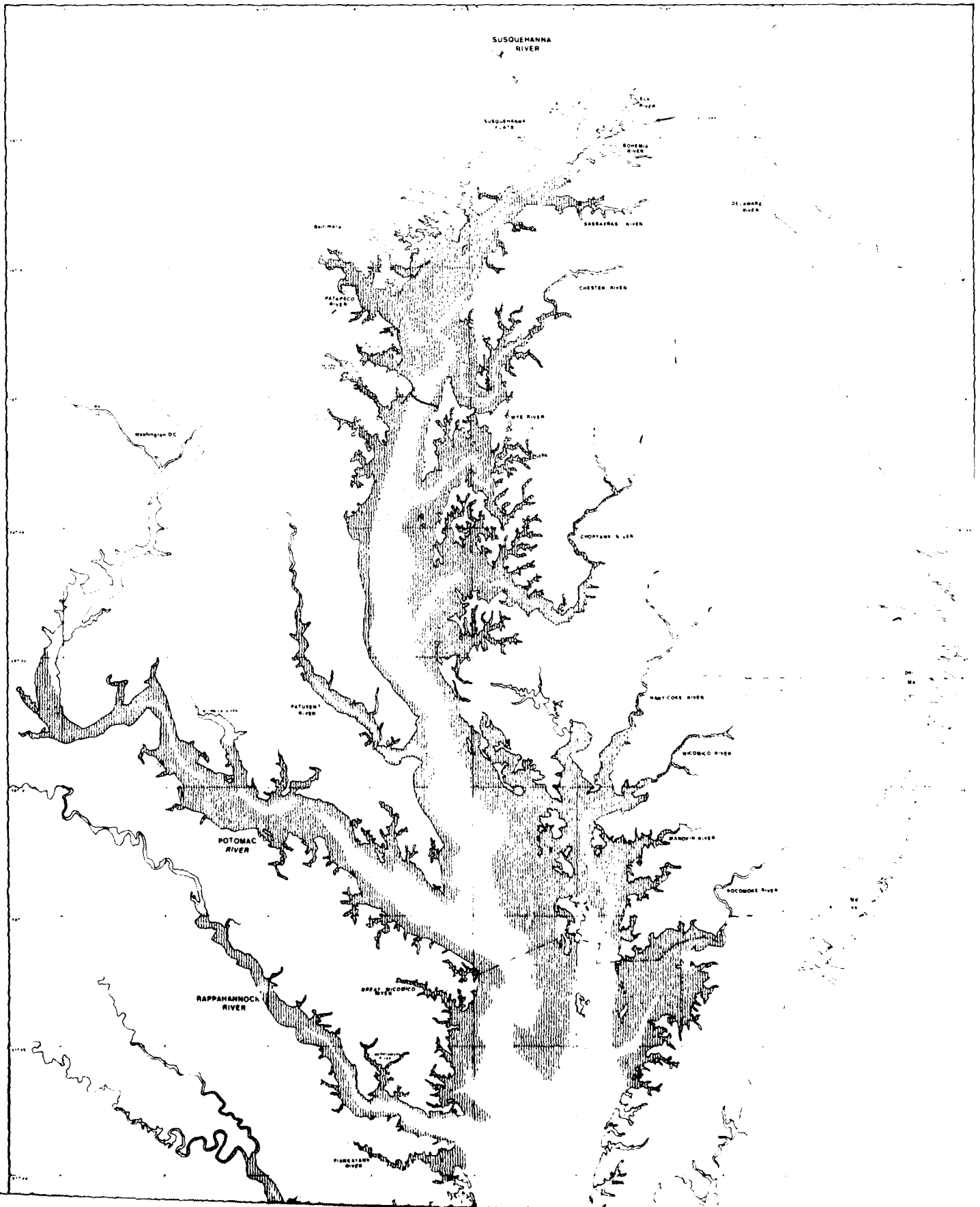












AD ALG 482

CHESAPEAKE BAY LOW FRESHWATER INFLOW STUDY APPENDIX F
MAP FOLIO(U) CORPS OF ENGINEERS BALTIMORE MD BALTIMORE
DISTRICT SEP 84 CMB-84-L-APP-F

513

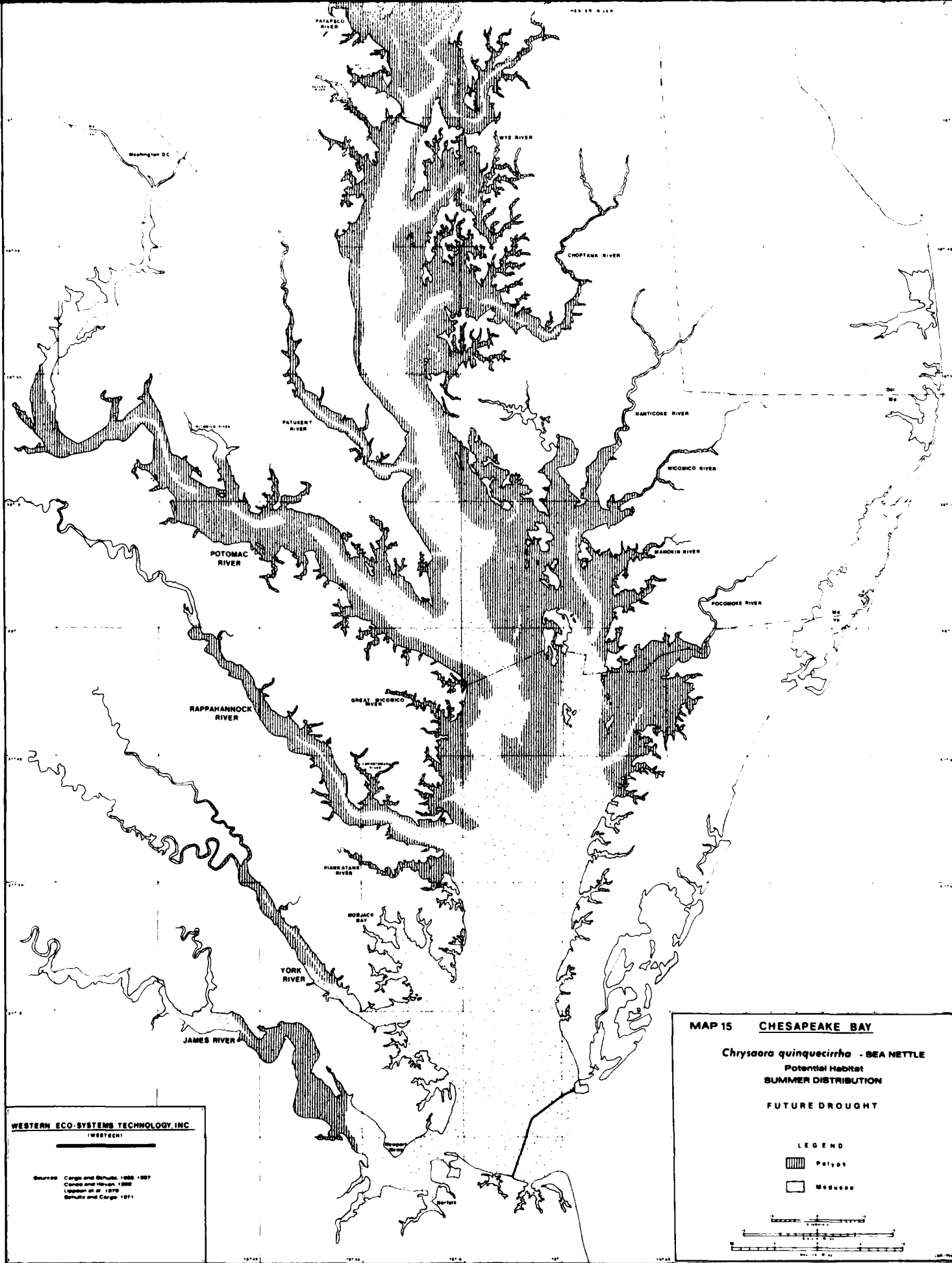
UNCLASSIFIED

F/G 8/1

14

END
CUBA
CUBA
-85
107





MAP 15 CHESAPEAKE BAY

Chrysaora quinquecirrha - SEA NETTLE

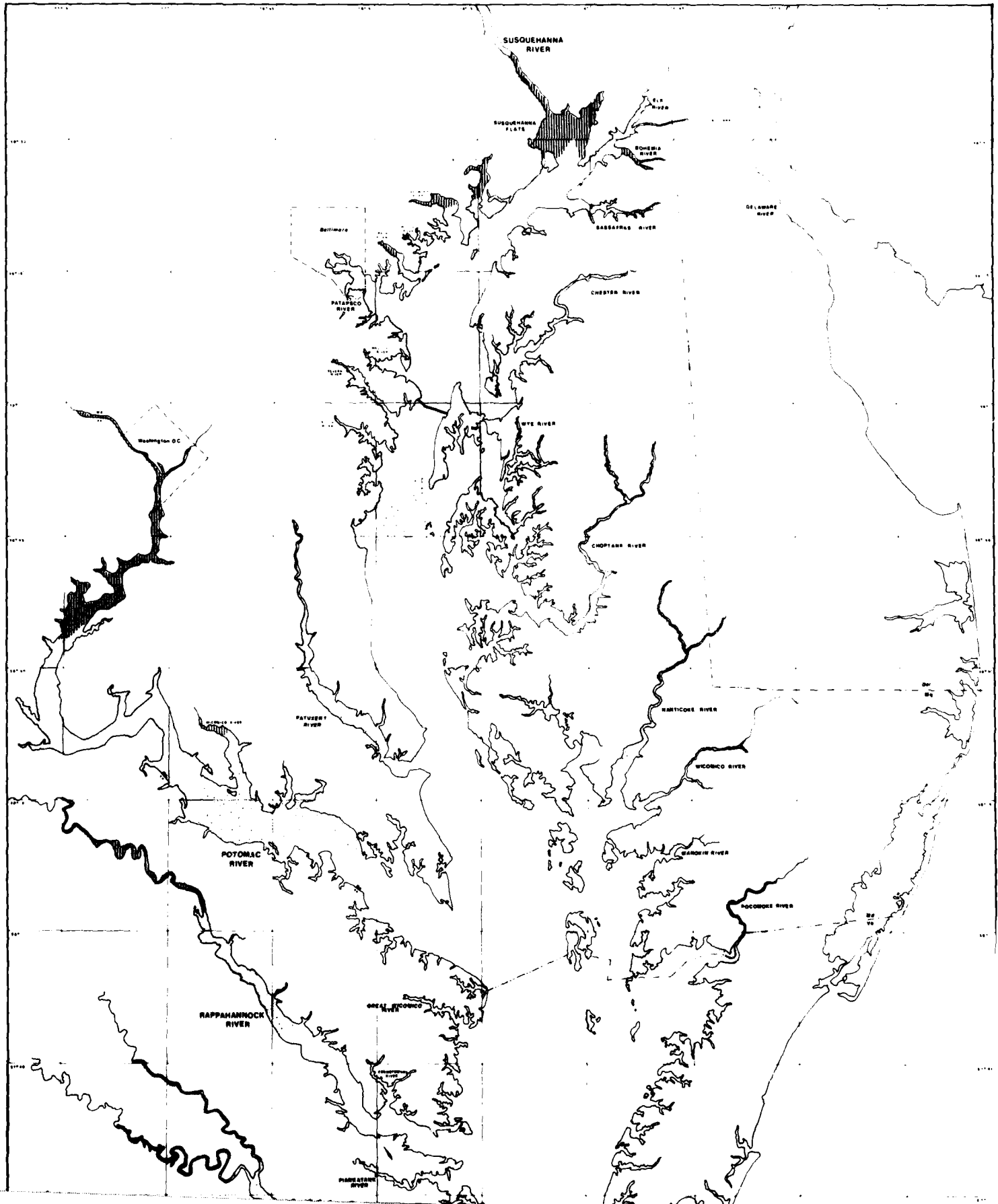
Potential Habitat
SUMMER DISTRIBUTION
FUTURE DROUGHT

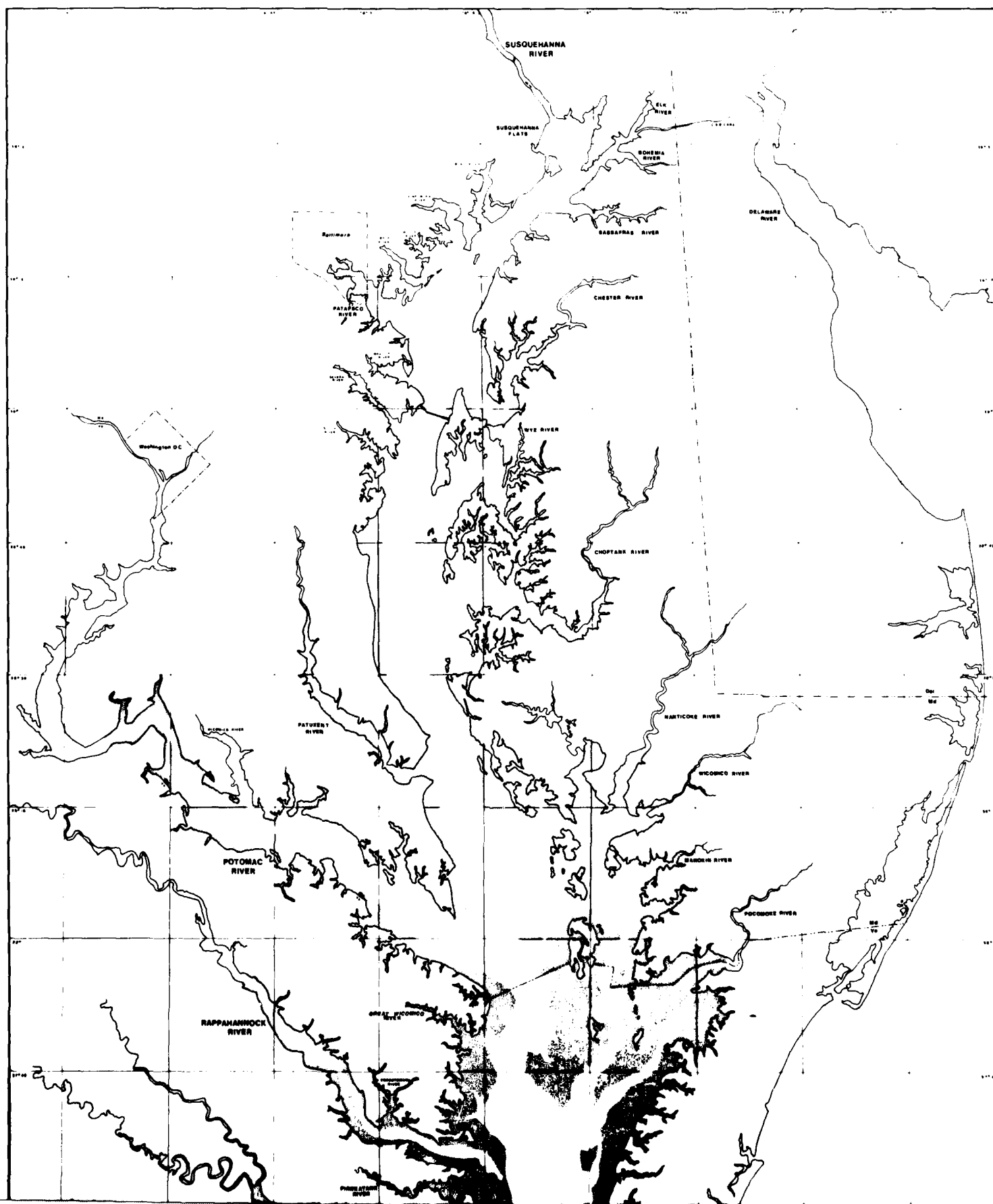
LEGEND

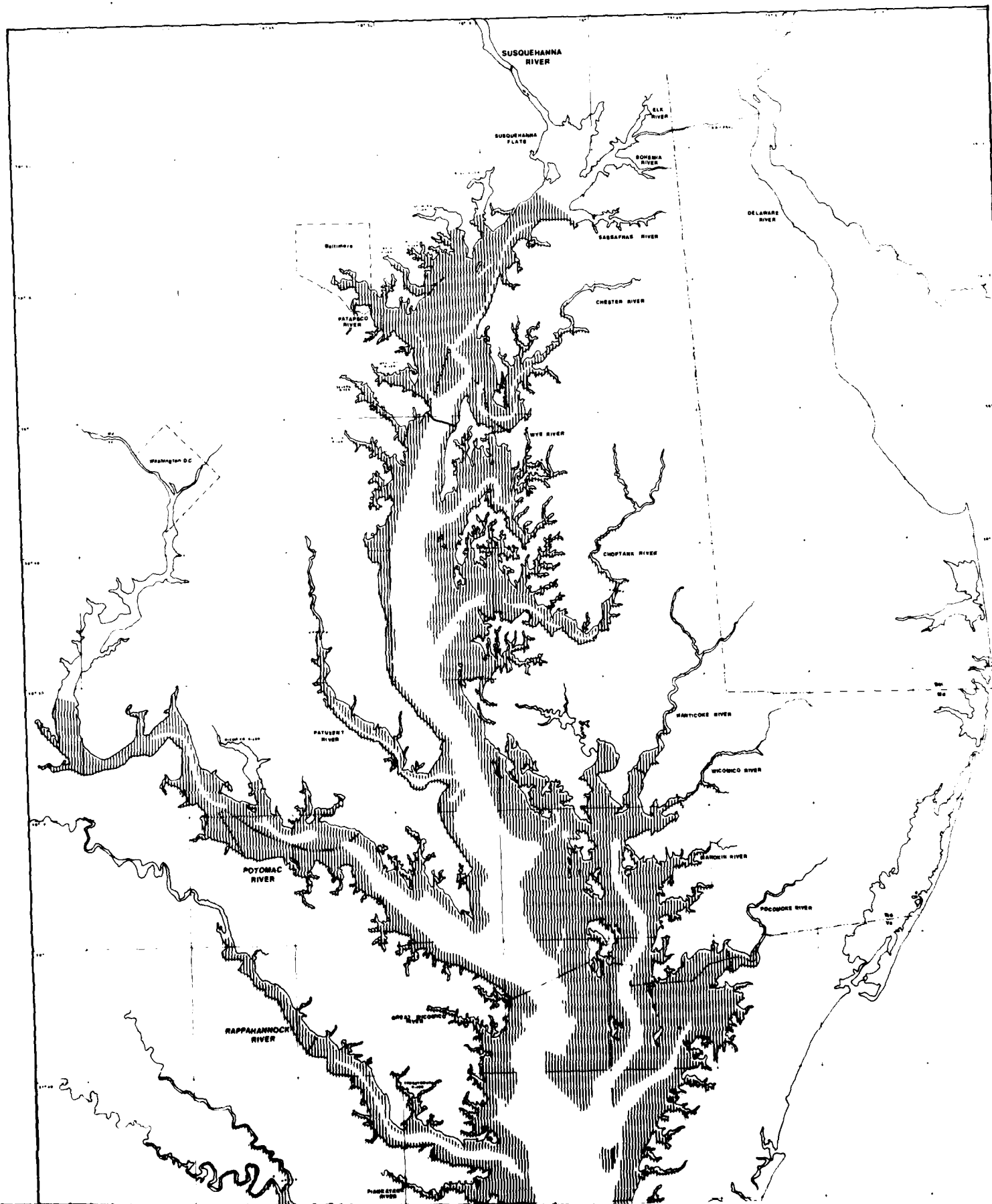
Polygs
 Mesosae

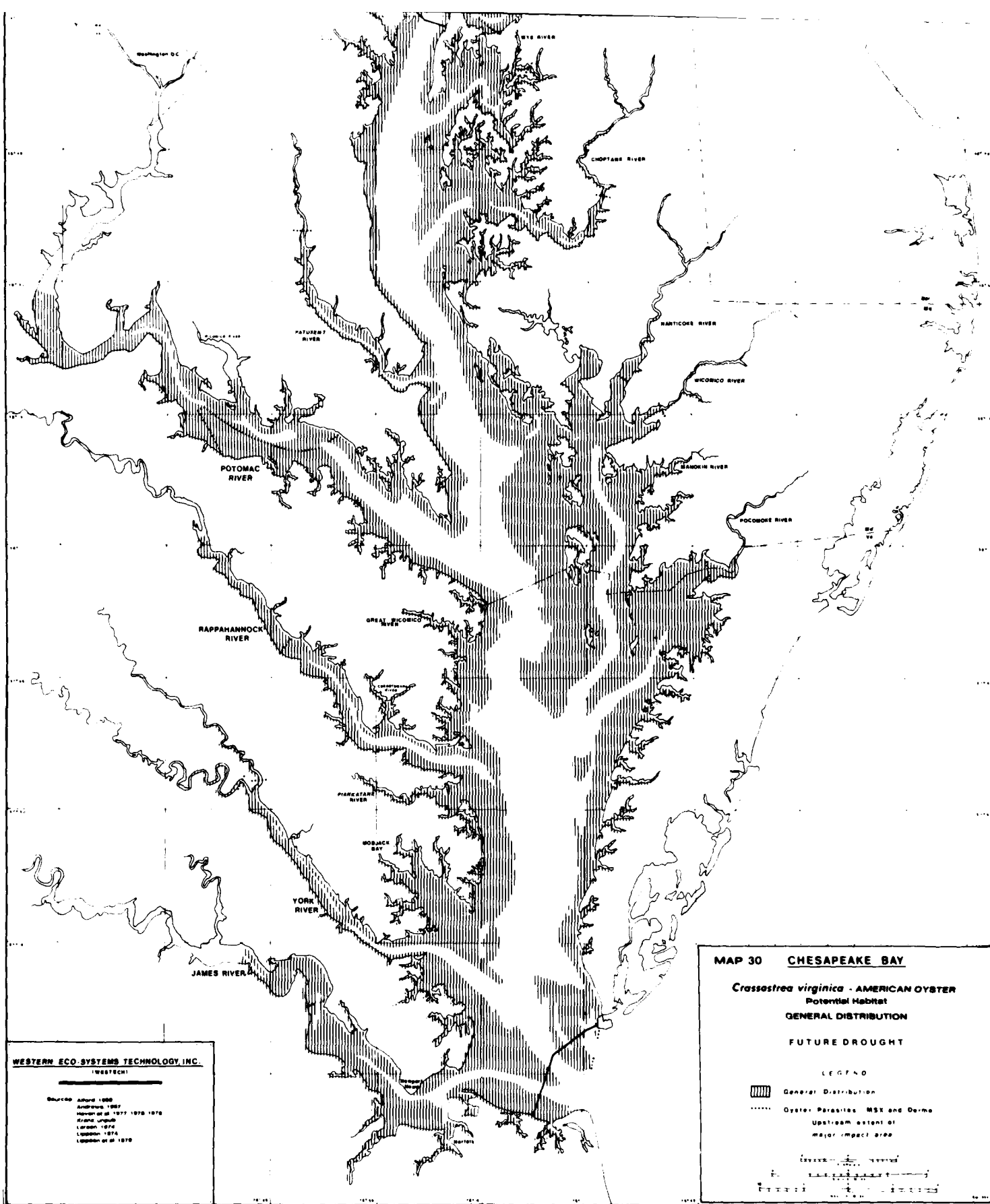
WESTERN ECO-SYSTEMS TECHNOLOGY, INC.
(WESTECH)

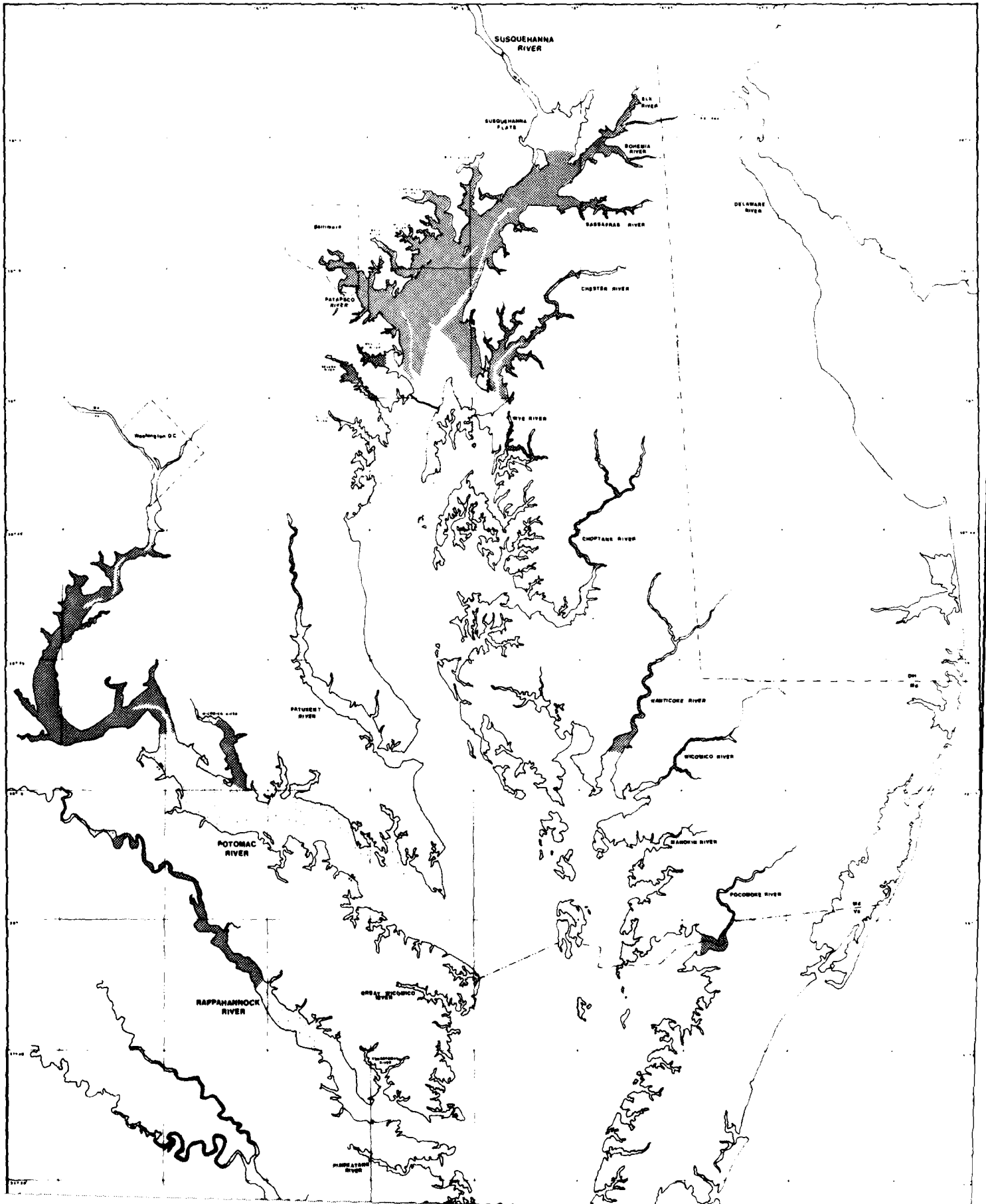
Sources: Cargill and Schultz, 1988, 1987
 Cargill and Haven, 1988
 Lippert et al., 1979
 Schultz and Cargill, 1971

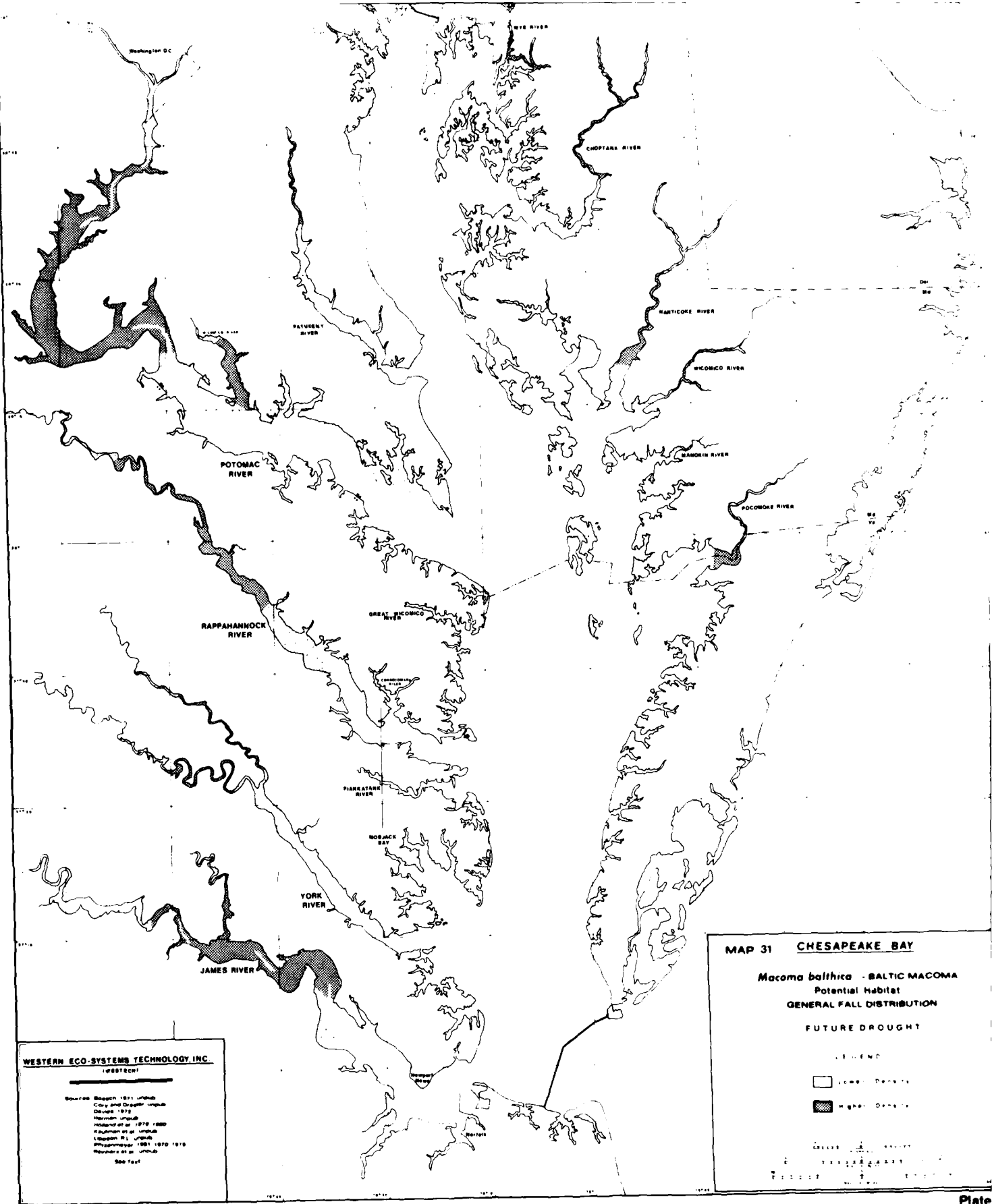












WESTERN ECO-SYSTEMS TECHNOLOGY, INC.
 (WESTECH)

Sources: Beach 1971, Unpub.
 Cary and Draper Unpub.
 Davies 1975
 Harman Unpub.
 Hoshinaka et al. 1979, 1980
 Kaufman et al. Unpub.
 Lippert H.L. Unpub.
 Mendenhall et al. 1981, 1979, 1978
 Mendenhall et al. Unpub.
 See Text

MAP 31 CHESAPEAKE BAY

Macoma balthica - BALTIC MACOMA
 Potential Habitat
 GENERAL FALL DISTRIBUTION
 FUTURE DROUGHT

LEGEND

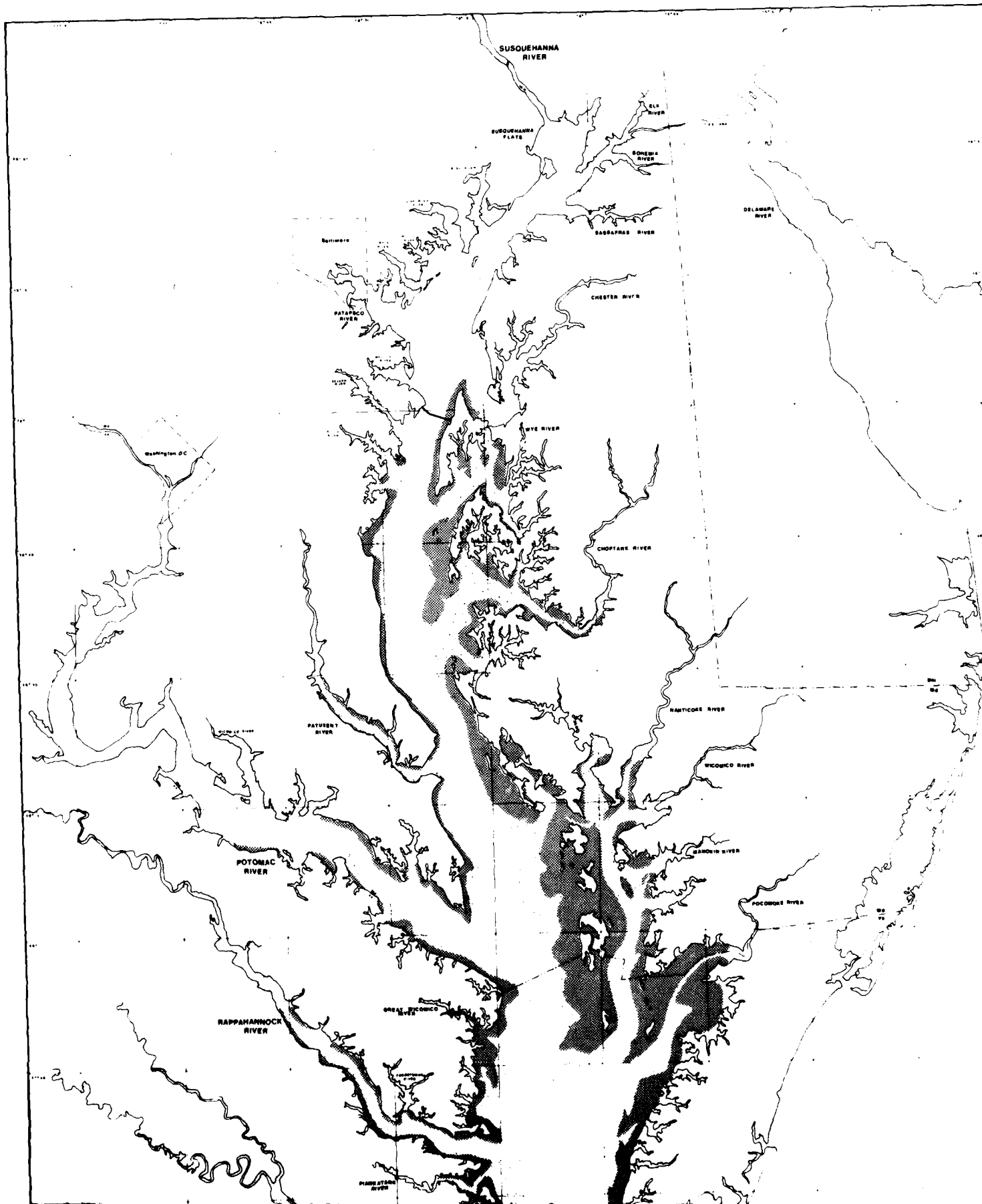
Low Density

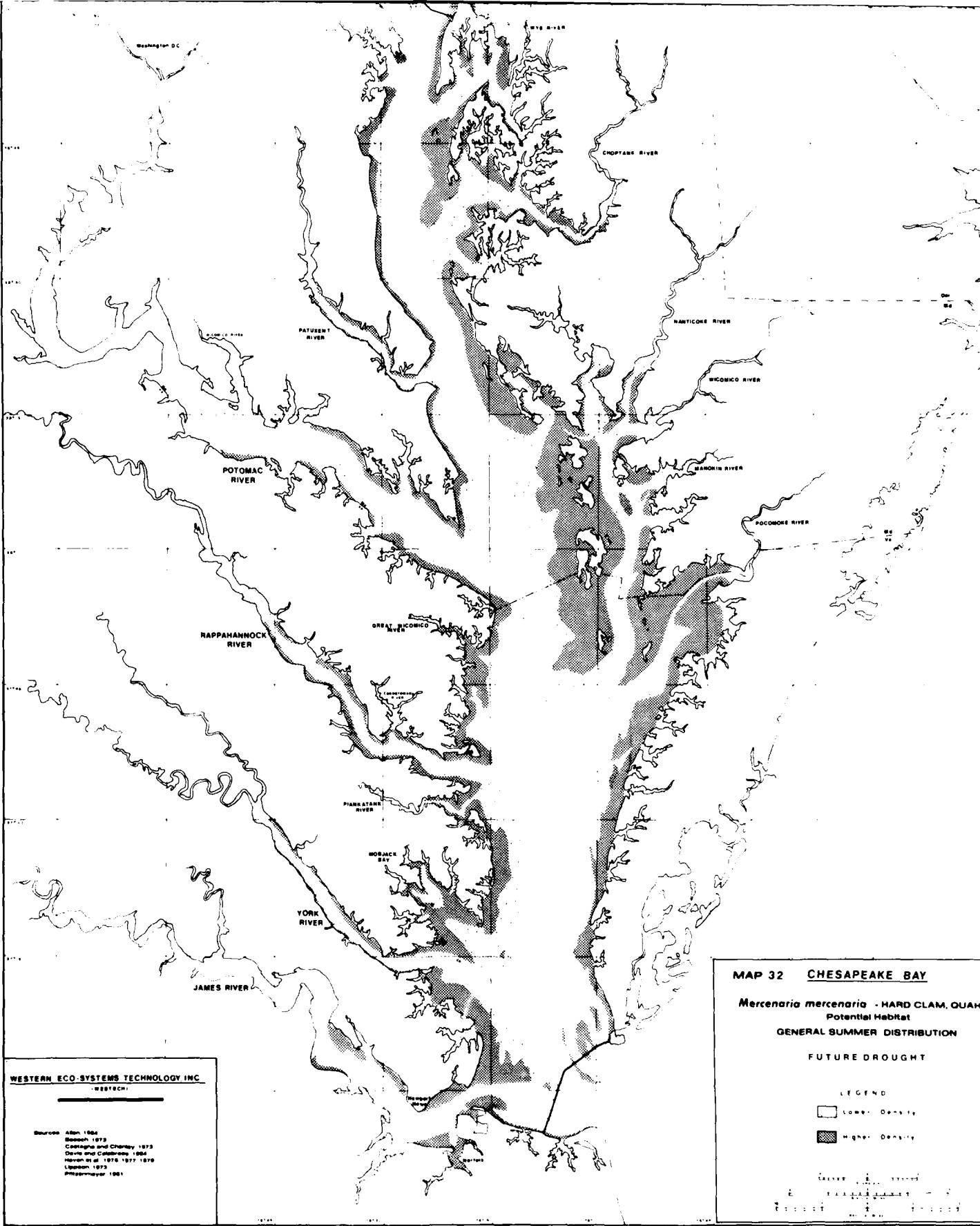
High Density

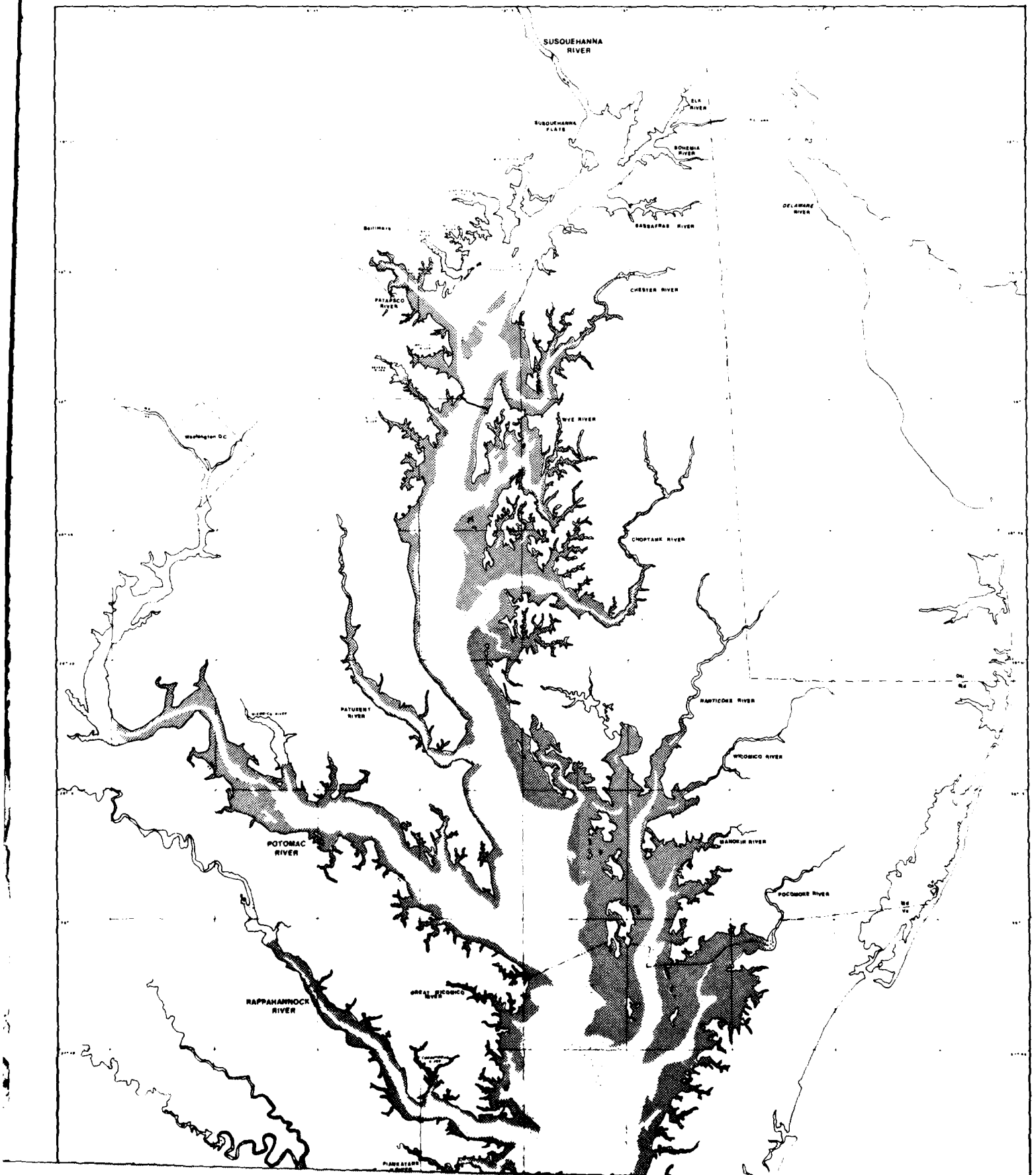
Scale 1:100,000

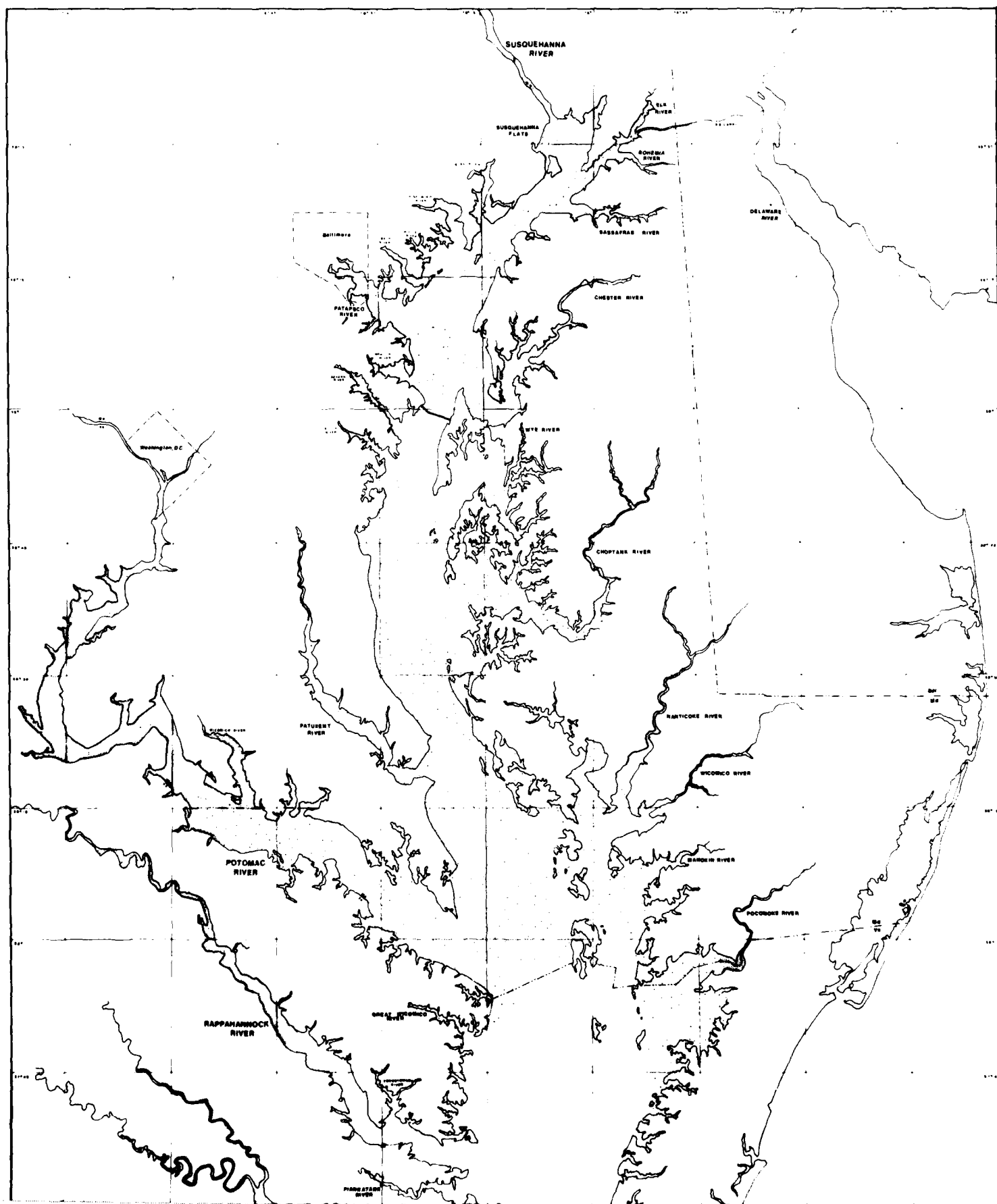
100 Miles

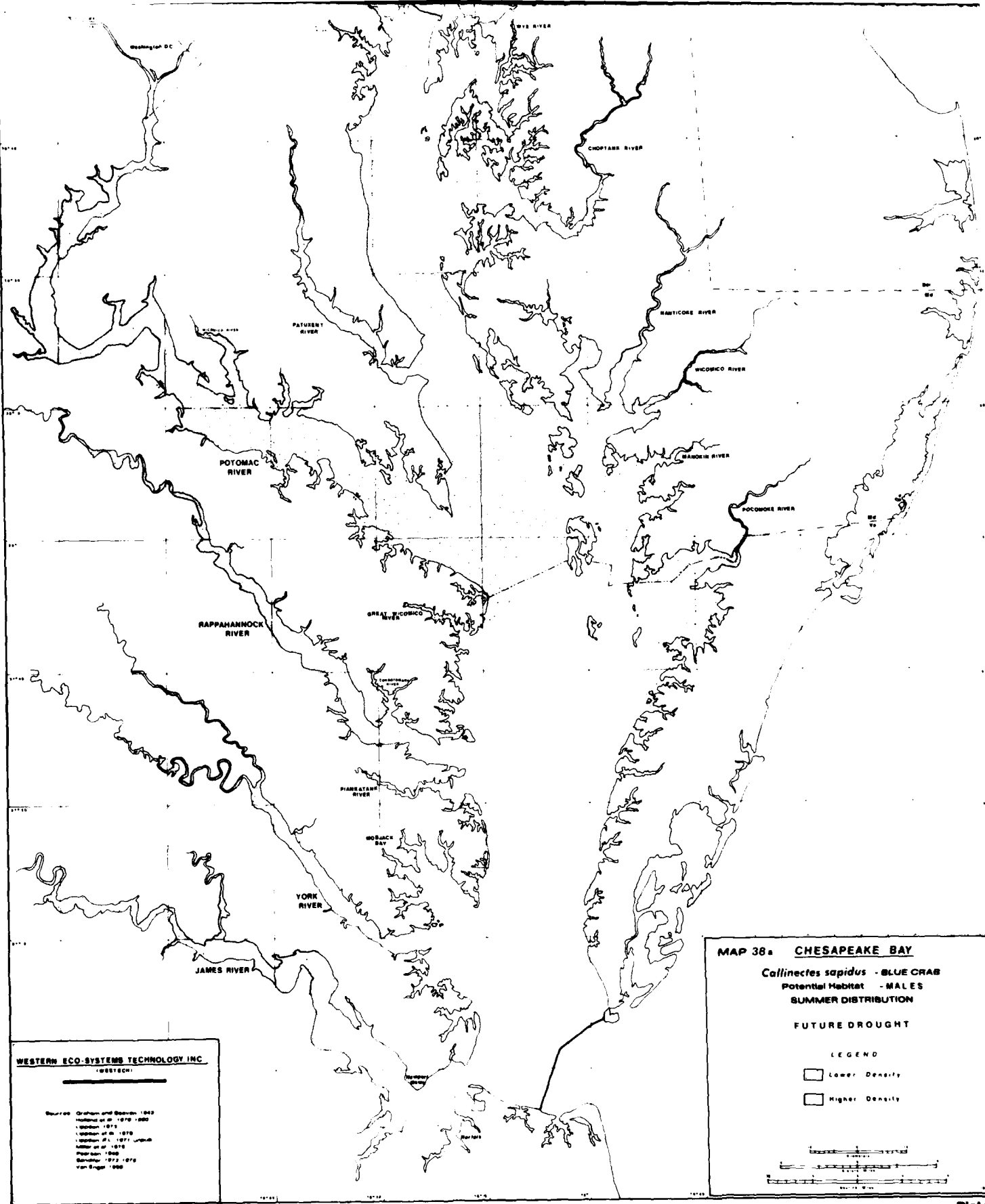
100 Kilometers

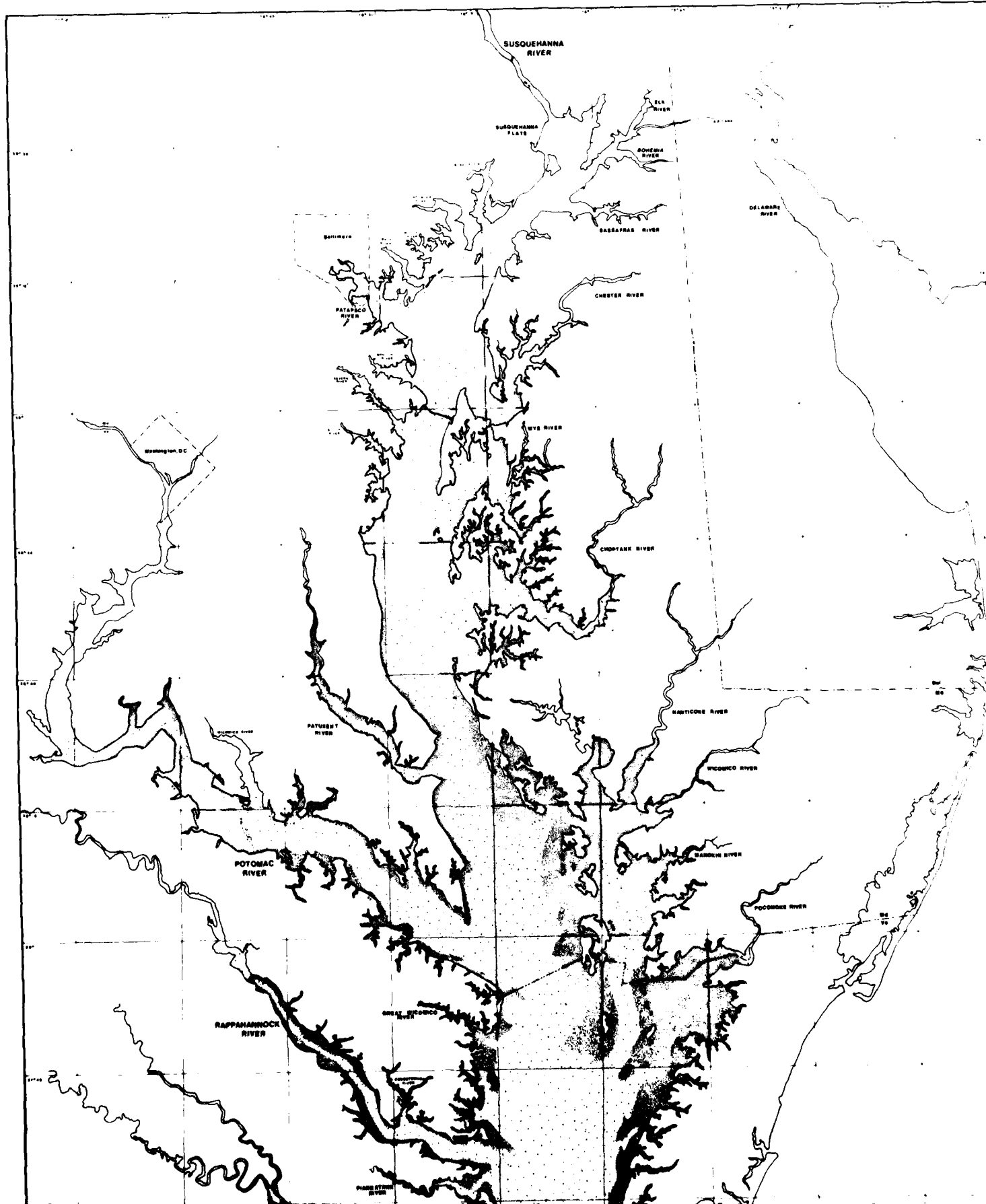


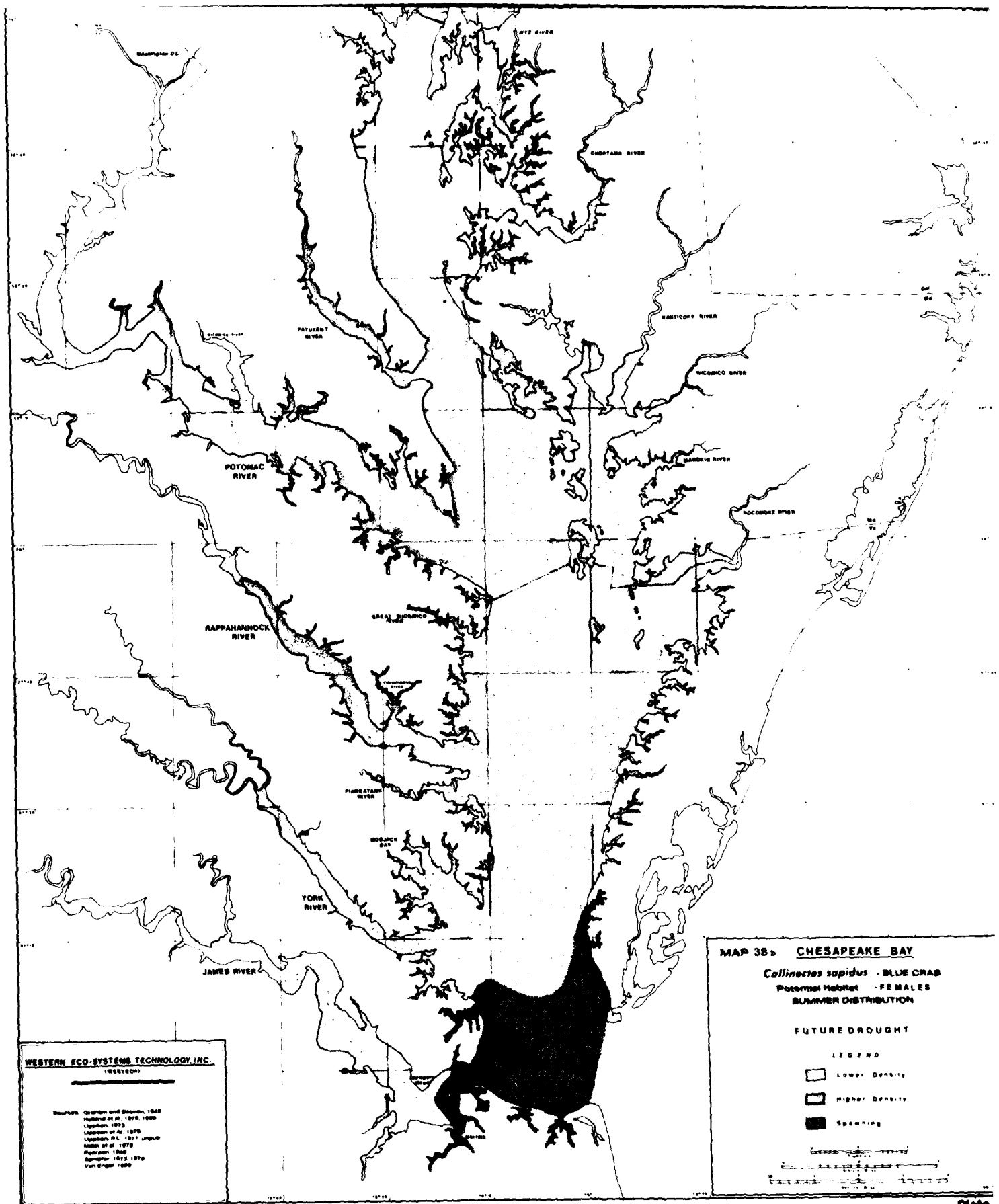


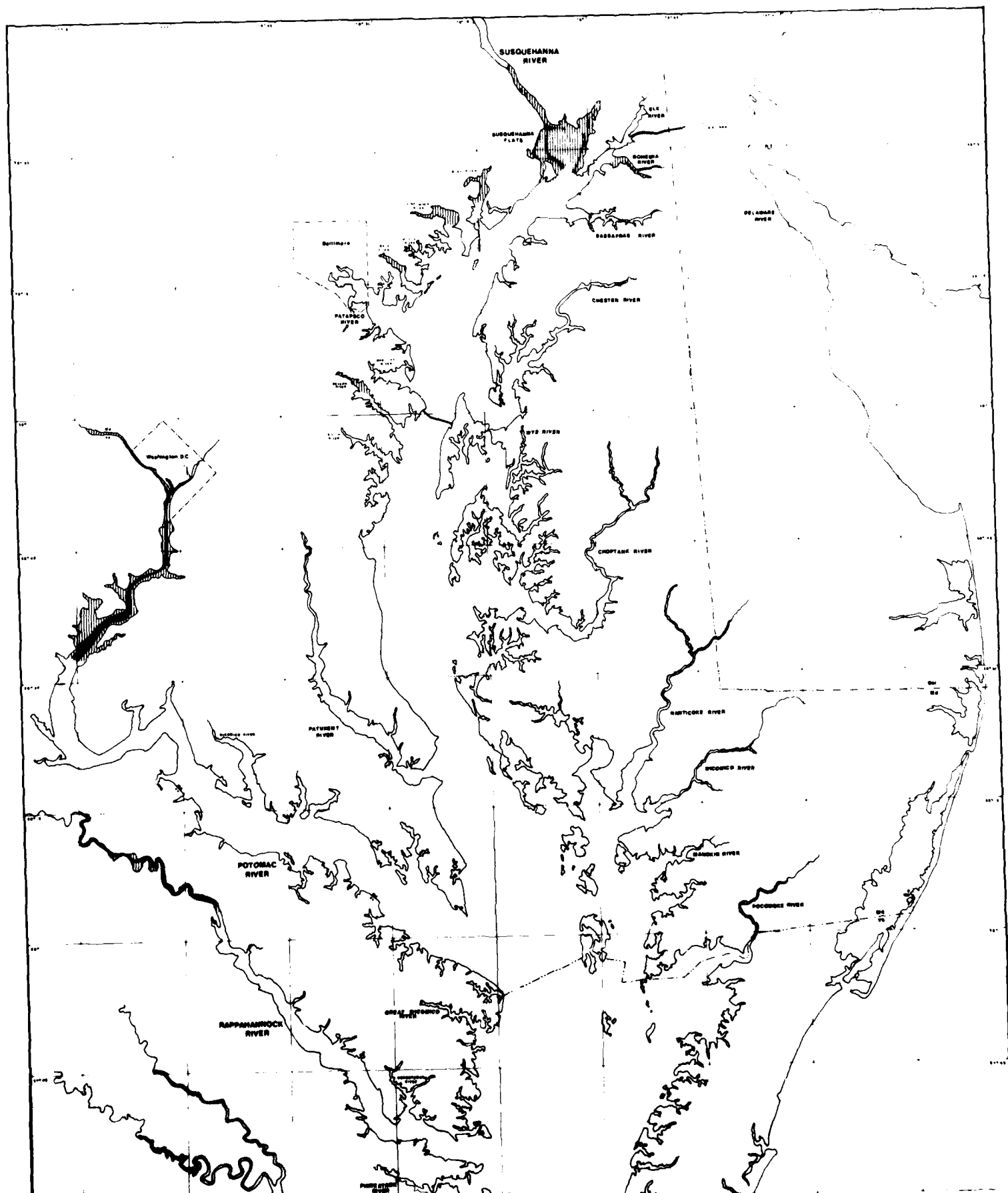


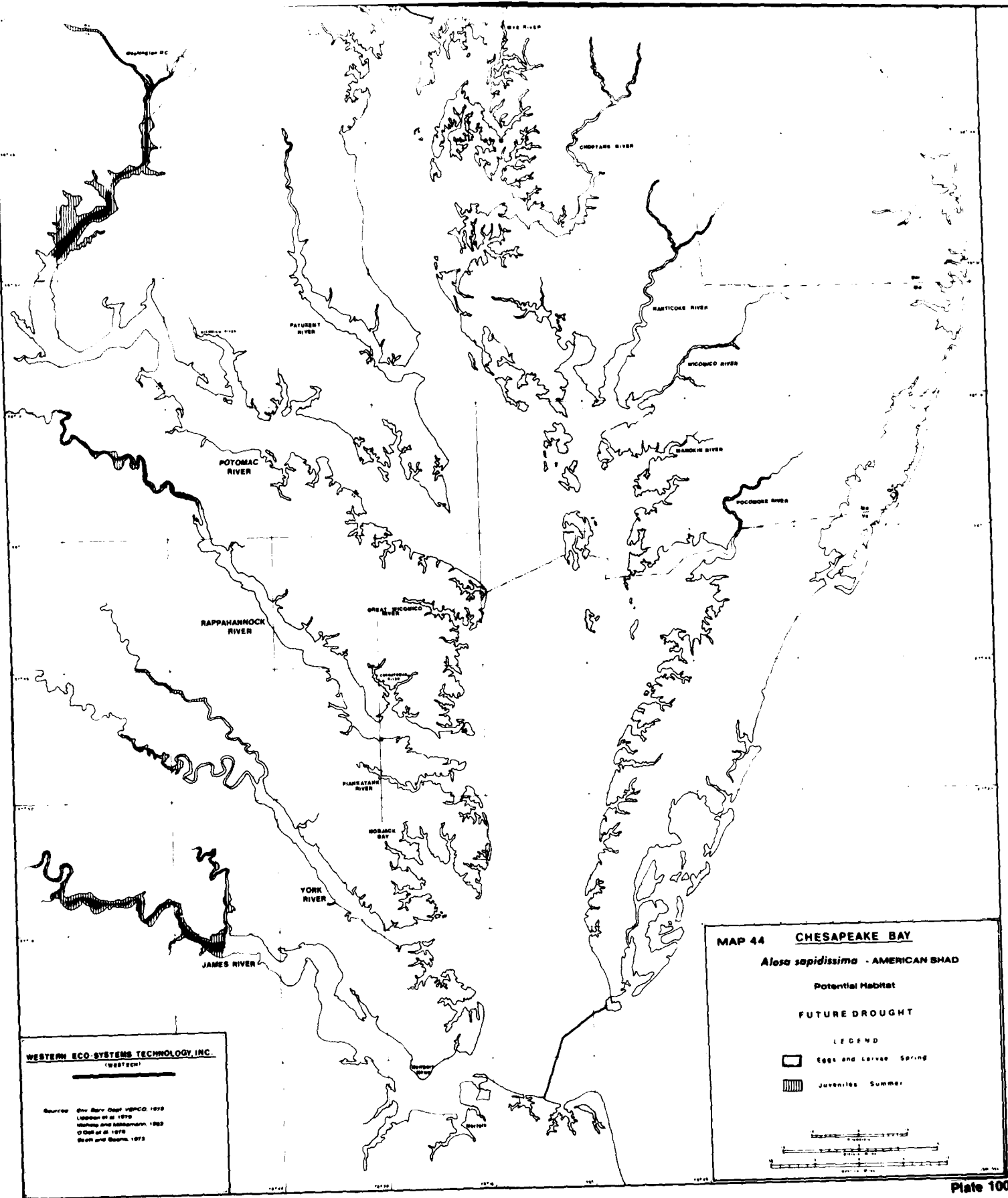


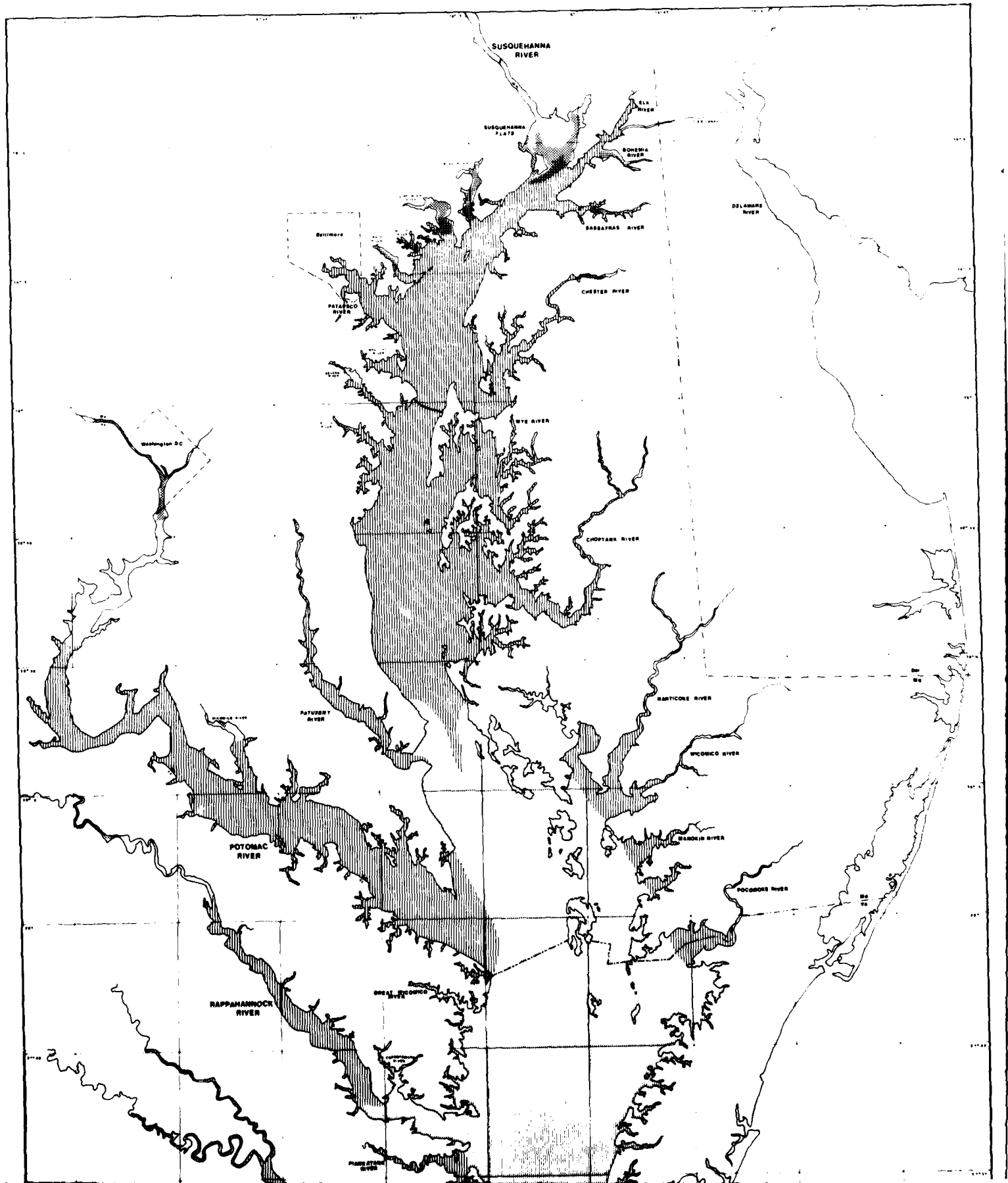


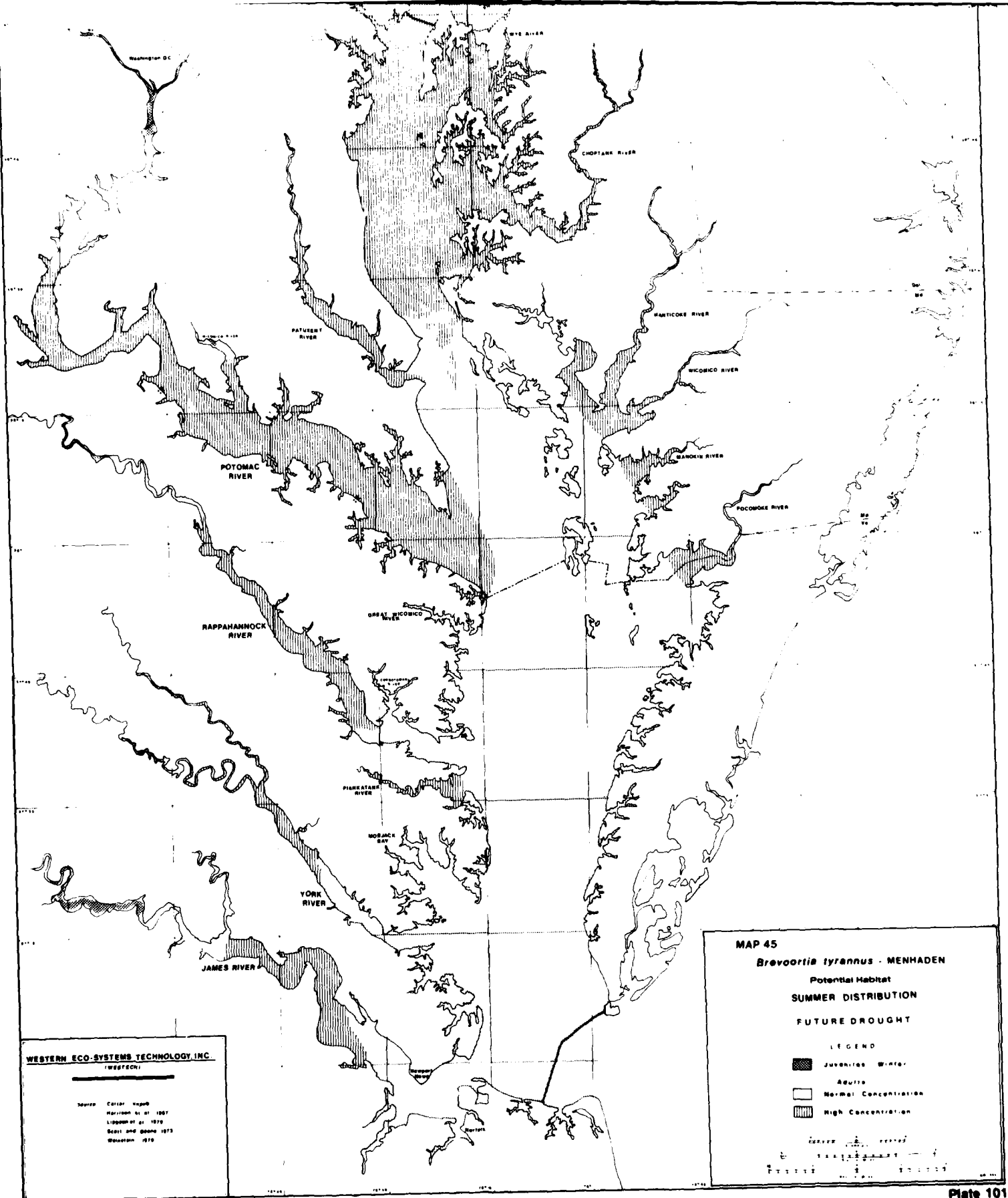


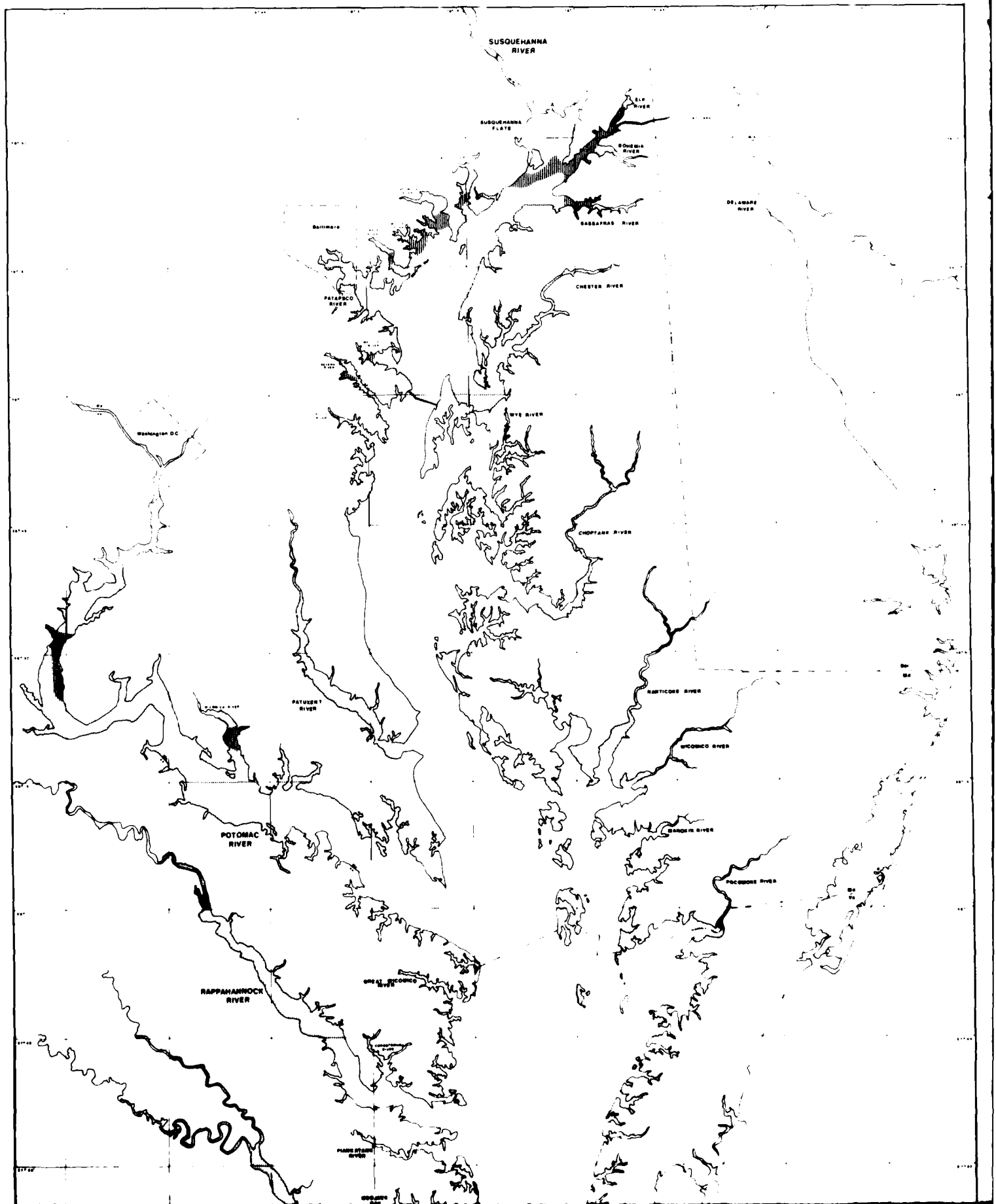


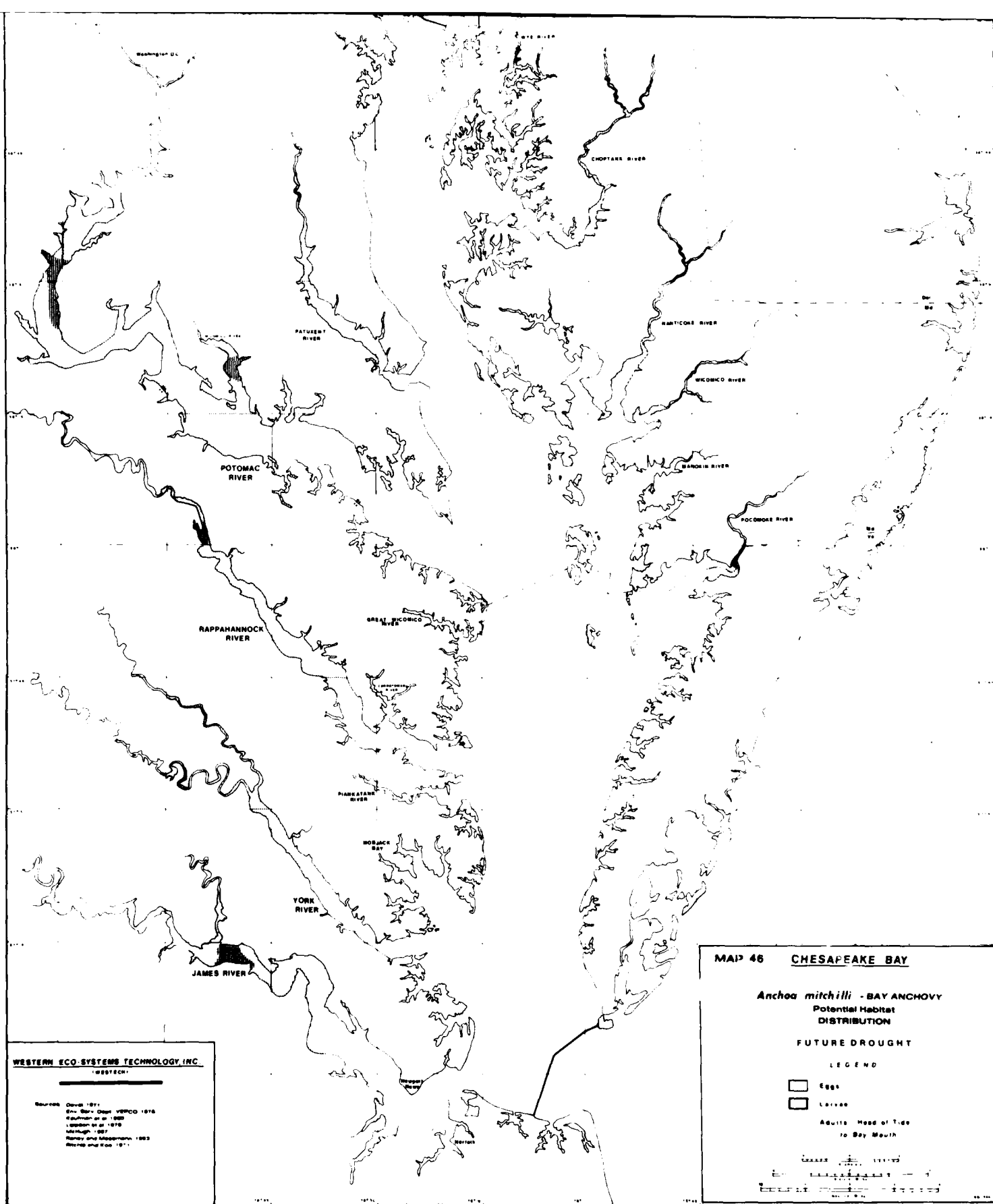


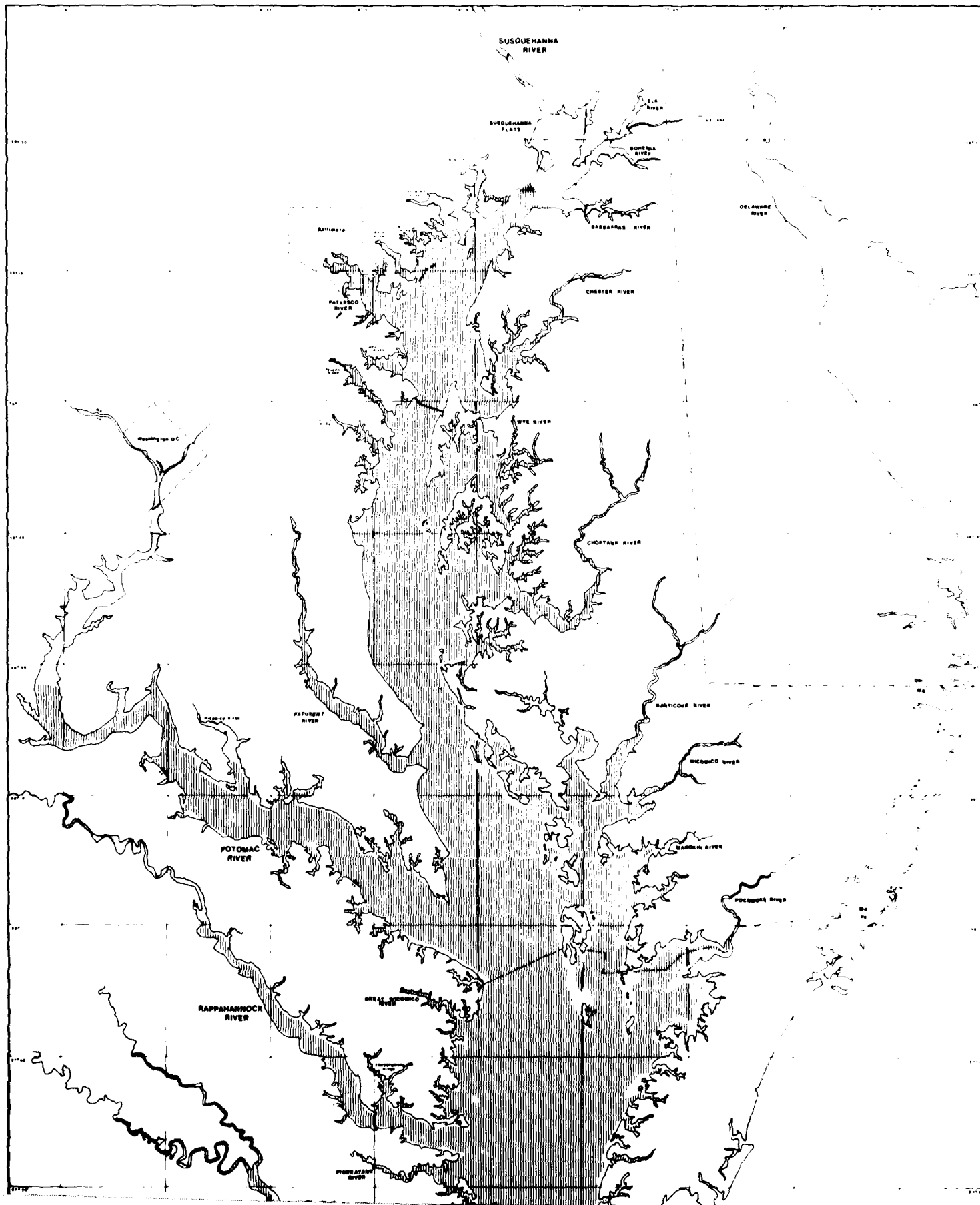


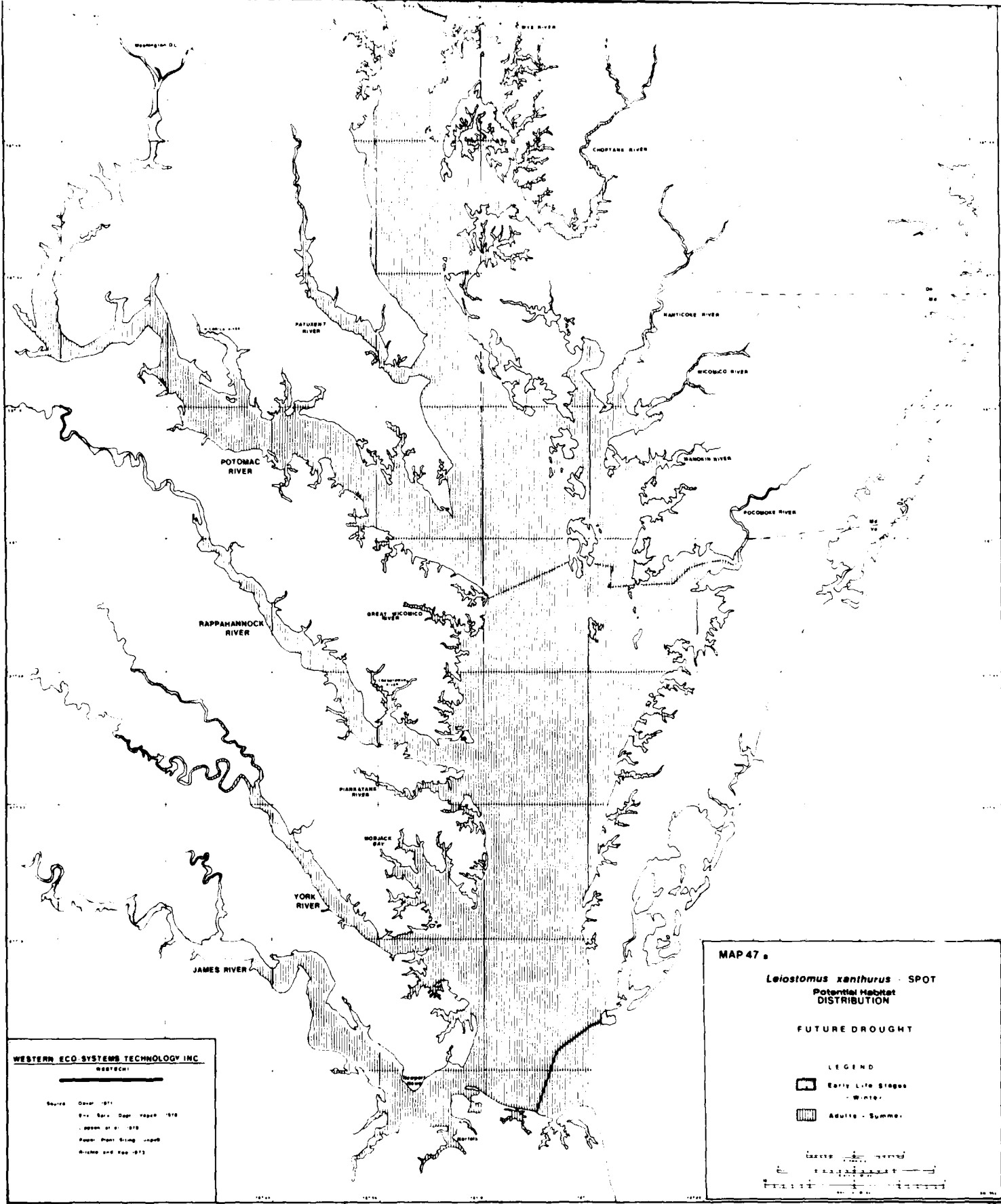












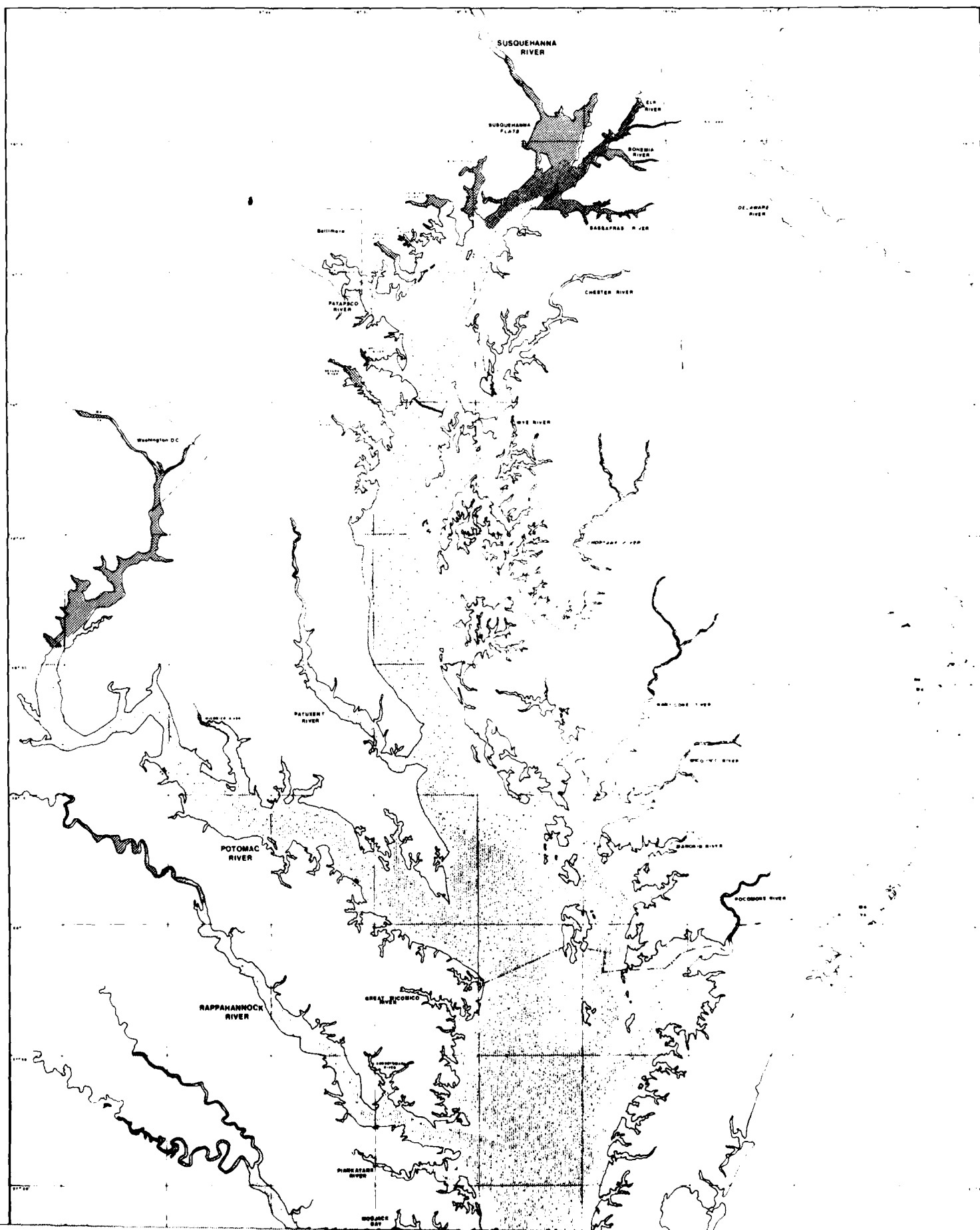
MAP 47
Leiostomus xanthurus - SPOT
 Potential Habitat
 DISTRIBUTION
 FUTURE DROUGHT

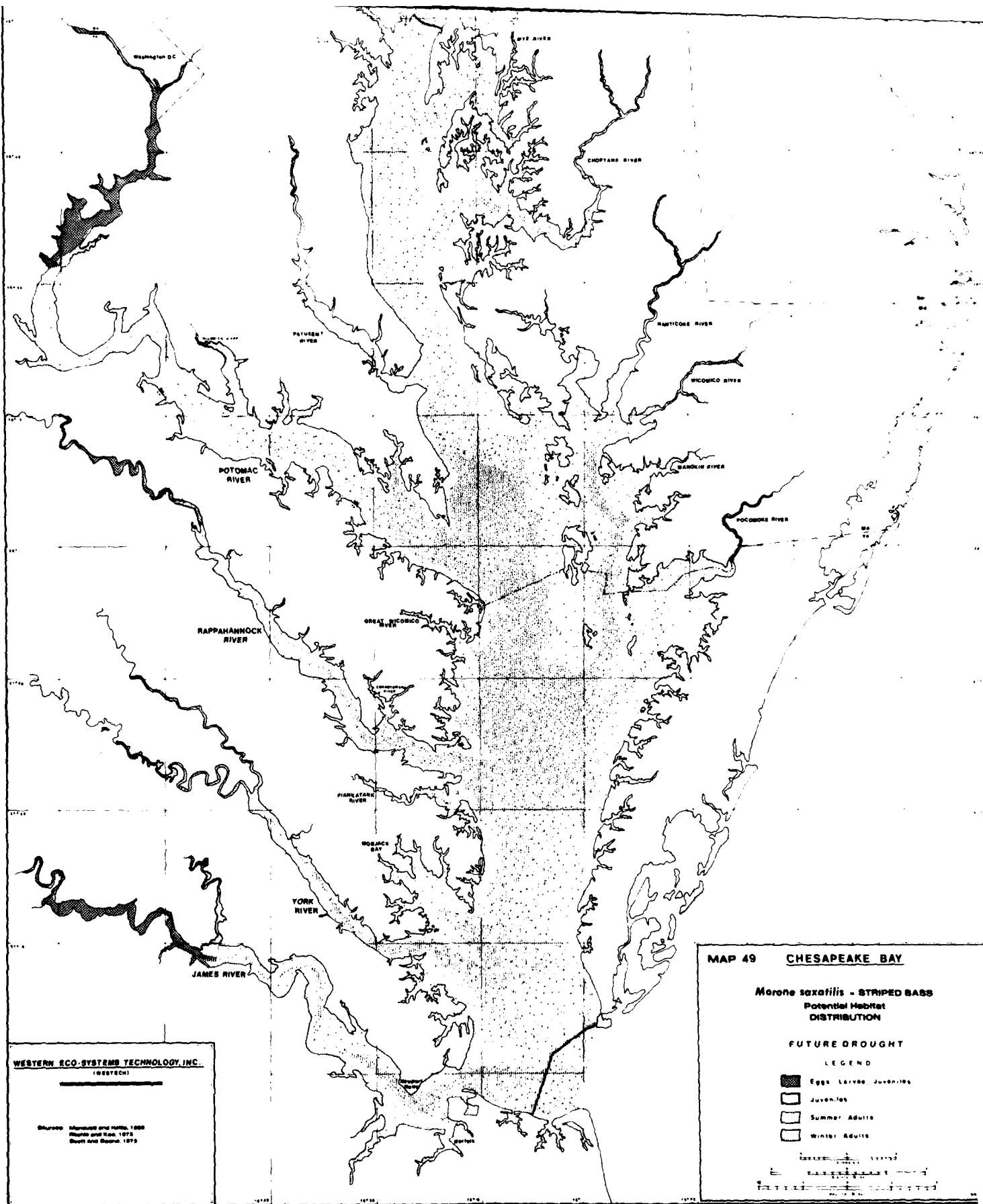
- LEGEND
- Early Life Stages - Winter
 - Adults - Summer

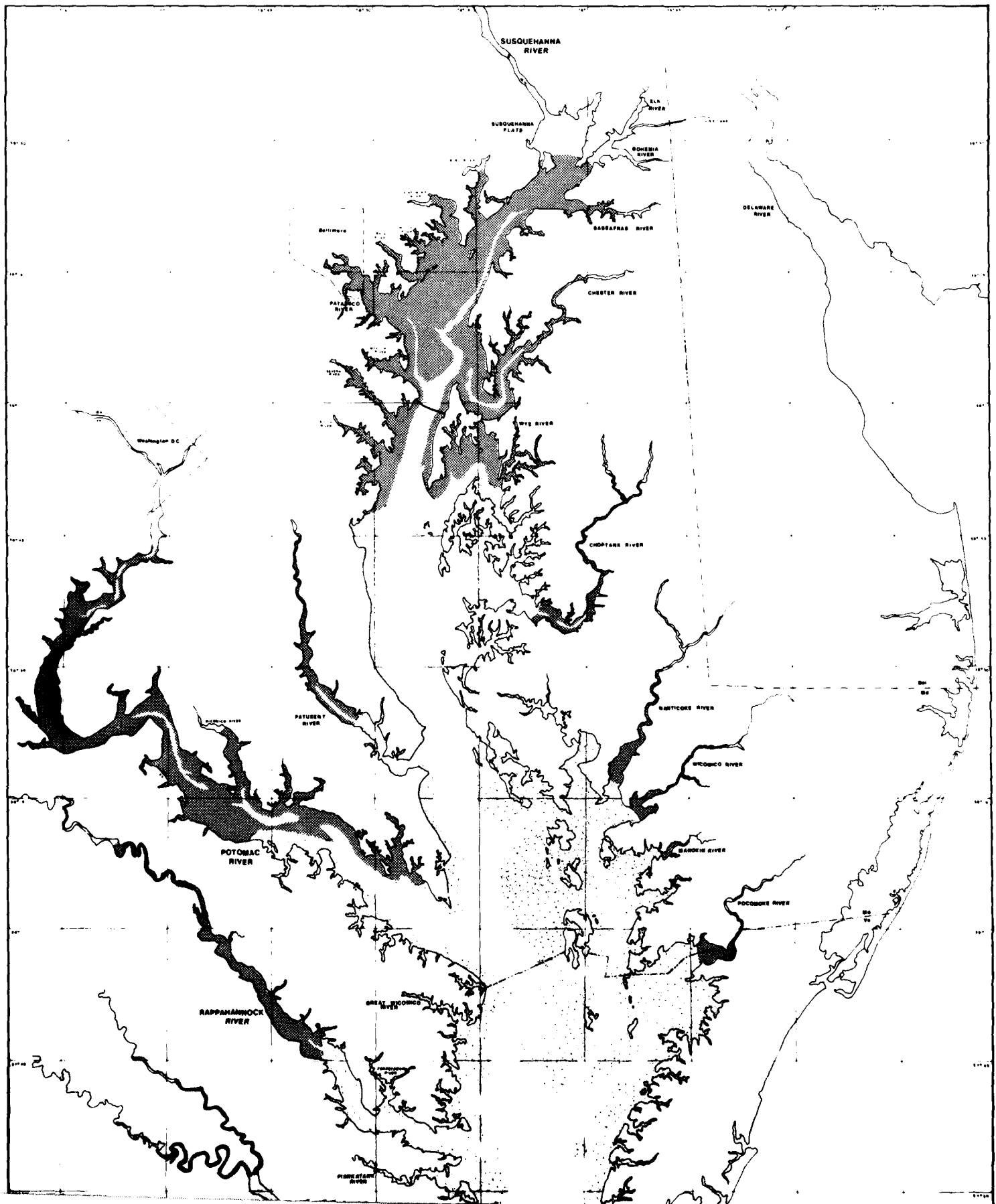


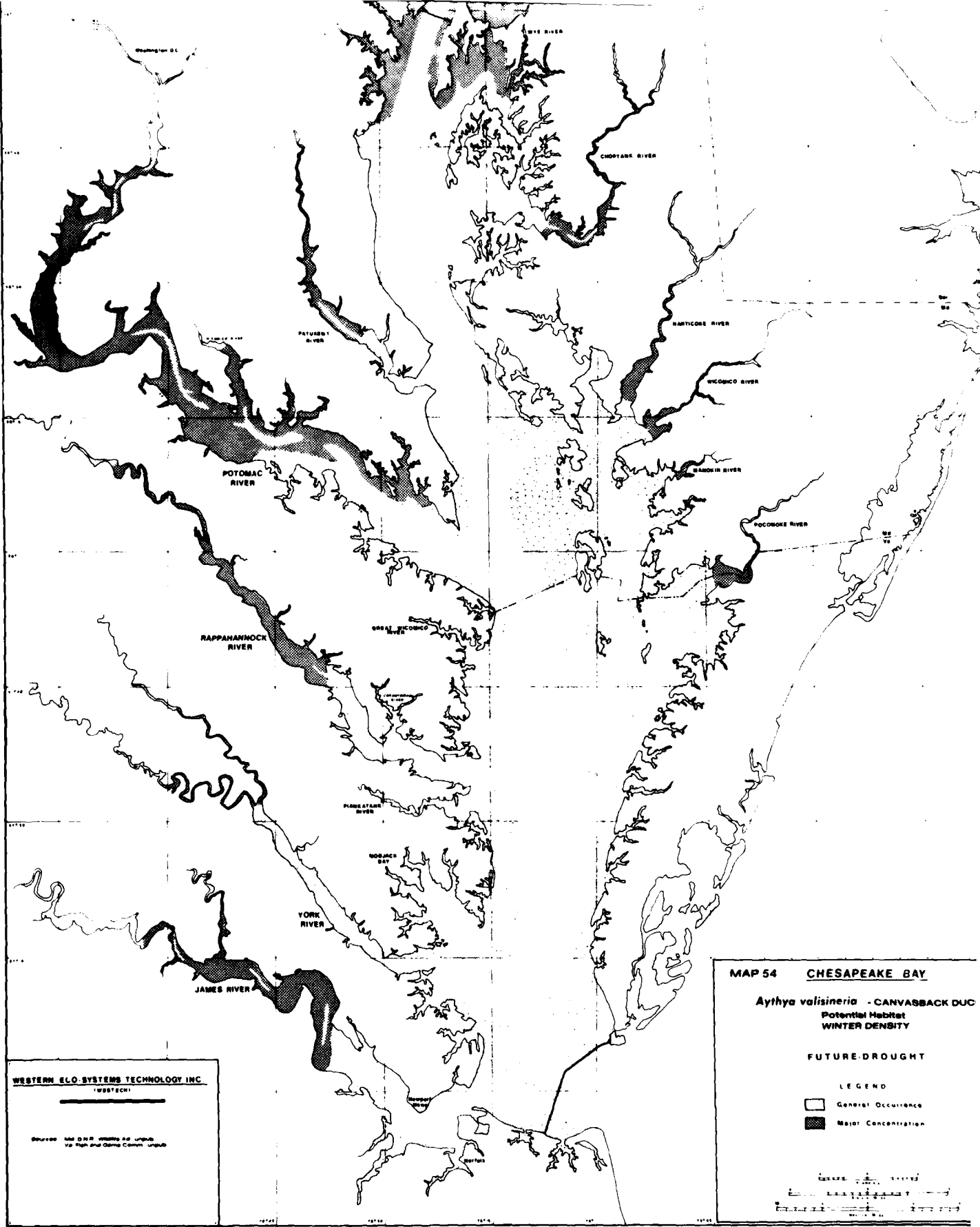
WESTERN ECO SYSTEMS TECHNOLOGY INC.
 WESTECH

Source: Omer, 1971
 E. & S. S. D. R. Report 1976
 L. J. J. et al. 1978
 F. J. J. et al. 1978
 A. J. J. et al. 1978









END

DATE
FILMED

1-86

DTI